

Manual for pgf-PeriodicTable 1.0.1

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The image displays a comprehensive periodic table of elements, organized into groups and periods. Each element cell contains its atomic number, chemical symbol, name, and relative atomic mass. The table is color-coded by groups, with the lanthanide and actinide series shown separately at the bottom. The elements are arranged in a standard periodic table layout, with the noble gases on the right and the alkali metals on the left.

`\pgfPT[show title=false,show legend=false]`

Abstract

The purpose of this package is to provide the Periodic Table of Elements in a simple way. It relies on `pgf/TikZ` to offer a full or partial periodic table with a variety of options and displaying the desired data. The data available, from all the actual 118 elements, is: atomic number, element name, chemical symbol, relative atomic mass, standard relative atomic mass, radioactivity, atomic radius (empirical), covalent radius, ionic radius, first ionization energy, electronegativity (Pauling), electroaffinity, oxidation states, melting point (in Kelvin and Celsius degrees), boiling point (in Kelvin and Celsius degrees), electron distribution, electronic configuration (increasing n and increasing $n + \ell$), density, specific heat capacity, thermal conductivity, lattice structure, lattice constants (a , b , c and c/a ratio), discovery year, discovery country and visible range spectral lines. It is possible to get the Periodic Table in six languages: English, French, German, Portuguese (from Portugal and from Brazil), Spanish and Italian.

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Installation and usage

`pgf-PeriodicTable` is placed under the terms of the L^AT_EX Project Public License, version 1.3 or later (<http://www.latex-project.org/lppl.txt>). `pgf-PeriodicTable` loads and only requires the `TikZ` package.

You need to put the package files (`pgf-PeriodicTable.sty` & *friends*) in a location where PDF_LA_TE_X, Lua_LA_TE_X or Xe_LA_TE_X can find them. According to the TDS conventions this may be a subdirectory named `tex/latex/pgf-PeriodicTable/` or `tex/latex/misc/` in your (site specific) installation tree (insert your appropriate directory delimiter instead of `/`, if needed).

If you are using PDF_LA_TE_X, Lua_LA_TE_X or Xe_LA_TE_X you can just simply include the style file without any option via the `\usepackage` command, `\usepackage{pgf-PeriodicTable}`

It can also be loaded with *one option* to select the desired language:

`\usepackage[language flag]{pgf-PeriodicTable}`

The *language flags* available are:

- ✓ **en** for English (default),
- ✓ **fr** for French,
- ✓ **de** for German,
- ✓ **pt** for Portuguese (Portugal),
- ✓ **br** for Portuguese (Brazil),
- ✓ **es** for Spanish and
- ✓ **it** for Italian.

The data

The data available in [pgf-PeriodicTable](#) was mainly compiled with selected and filtered data from Wikipedia, taken from November 2021 to July 2022.

acronym	description	unit	remarks (compiled from @date)
Ar	Relative Atomic Mass		(Wikidata @09/jan/2022)
Arstar	Standard Relative Atomic Mass		STANDARD ATOMIC WEIGHTS 2021, Commission on Isotopic Abundances and Atomic Weights, © CIAAW, 2007–2022 (https://ciaaw.org/impressum.htm)
radio	Radioactivity		(gperiodic-3.0.3, Dec 26 2018)
R	Atomic Radius	pm	Calculated (Wikidata @04/jul/2022)
Rcov	Covalente Radius	pm	Single bond, Wikidata @04/jul/2022)
Rion	Ionic Radius	pm	(Wikidata @04/jul/2022)
Ei	First Ionization Energy	$\text{kJ} \cdot \text{mol}^{-1}$	(Wikidata @04/jul/2022)
eneg	Electronegativity (Pauling)		(Wikidata @04/jul/2022)
eaff	Electroaffinity	$\text{kJ} \cdot \text{mol}^{-1}$	(Wikidata @04/jul/2022)
O	Oxidation States		(Wikidata @09/jan/2022)
Tmelt	Melting Point	K	at standard pressure (Wikidata @21/dez/2021)
TmeltC	Melting Point	°C	at standard pressure (Wikidata @21/dez/2021)
Tboil	Boiling Point	K	at standard pressure (Wikidata @21/dez/2021)
TboilC	Boiling Point	°C	at standard pressure (Wikidata @21/dez/2021)
eDist	Electron Distribution		(Wikidata @01/nov/2021)
eConfign	Electronic Configuration (increasing n)		(Wikidata @01/nov/2021)
eConfign	Electronic Configuration (increasing $n + \ell$)		(Wikidata @01/nov/2021)
d	Density	$\text{g} \cdot \text{dm}^{-3}$ for gases $\text{g} \cdot \text{cm}^{-3}$ all other physical states	physical state at 25°C, 1 atm (Wikidata @01/nov/2021)
Cp	Specific heat capacity	$\text{J} \cdot \text{mol}^{-1} \cdot \text{K}^{-1}$	at 25°C and 100 kPa (Wikidata @20/nov/2021)
kT	Thermal Conductivity	$\text{W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$	at 25°C (Wikidata @21/nov/2021)
Is	Lattice Structure		(Wikidata @20/dez/2021 and University of Bielefeld)
Isa	Lattice constant: a	pm	(University of Bielefeld @21/dez/2021)
Isb	Lattice constant: b	pm	(University of Bielefeld @21/dez/2021)
Isc	Lattice constant: c	pm	(University of Bielefeld @21/dez/2021)
Isca	Lattice c/a ratio		Calculated from available data and rounded to two digits
DiscY	Discover Year		(Wikidata @22/dez/2021)
DiscC	Discover Country		(Wikidata @22/dez/2021)
spectra	Visible range spectral lines		Elements spectrum made with \pgfspectra . See the pgf-spectra manual for more details

The utilization of the *acronyms* will be explained in [Designing cells with \pgfPTbuildcell](#).

This command can also be used with options – as described in section [Options for \pgfPT](#): creating a «Periodic Table» – to modify, for instance, the font of the Periodic Table or the colors of the cells:

```
\pgfPT[font=pnc,back color scheme=MNM]
```

Periodic Table of Elements

The periodic table displays elements with their atomic number (Z), chemical symbol, name, and relative atomic mass (Ar). Elements are color-coded by groups: alkali metals (blue), alkaline earth metals (orange), transition metals (green), post-transition metals (yellow), nonmetals (red), halogens (purple), noble gases (pink), and lanthanides/actinides (grey). Radioactive elements are marked with a red 'R'.

► Utilization of \pgfPTstyle[options list]

This command globally sets a style for the Periodic Table:

```
\pgfPTstyle[font=ptm,IUPAC=false,show title=false]
\pgfPT
```

This periodic table uses the \pgfPTstyle command with options font=ptm, IUPAC=false, and show title=false. The elements are displayed in a serif font, and the color scheme is different from the standard periodic table. The title 'Periodic Table of Elements' is not shown.

It is possible to locally override the *global style* defined:

```
\pgfPT[show title]
```

Periodic Table of Elements

The image displays a standard periodic table of elements. It includes element symbols, names, atomic numbers, and relative atomic masses. A legend box in the upper left corner defines the symbols used for atomic number (Z), radioactivity (Ra), chemical symbol (CS), element name (N), and relative atomic mass (Ar). The table is organized into groups and periods, with lanthanoids and actinoids shown separately below the main table.

► Utilization of \pgfPTresetstyle

This command resets the style used in the Periodic Table to default values:

```
\pgfPTresetstyle
```

```
\pgfPT
```

Periodic Table of Elements

The image displays a periodic table of elements, similar to the one above but with a different layout style. It includes element symbols, names, atomic numbers, and relative atomic masses. A legend box in the upper left corner defines the symbols used for atomic number (Z), radioactivity (Ra), chemical symbol (CS), element name (N), and relative atomic mass (Ar). The table is organized into groups and periods, with lanthanoids and actinoids shown separately below the main table.

► Utilization of `\pgfPTbuildcell(nrows,ncolumns)[entries]`

With `\pgfPTbuildcell` it is possible to customize the *elementar* cell of the Periodic Table. Each cell is built on the given *number of rows* and *number of columns*. After that, each *entry* is constructed according to the structure *row;column;what* or *initial row-final row;initial column-final column;what*.

- ✓ The first *syntax* – *row;column;what* – puts «*what*» in the «*row*» row and in the «*column*» column with the height of one row and the width of one column:
 - for example, `1;1;Z` puts the atomic number `Z` in row `1` and column `1`, which actually corresponds to a box anchored to the top left corner of the cell and that goes below and to the right of that corner.
- ✓ The second *syntax* – *initial row-final row;initial column-final column;what* – puts «*what*» from «*initial row*» to «*final row*» with the height of *final row* – *initial row* + 1 and from «*initial column*» to «*final column*» with the width of *final column* – *initial column* + 1. It is important to keep in mind that when using this syntax the *row* and *column* could have any value between **1** and **number of rows** and **number of columns**, respectively.
 - for example, `1;1-2.1;Z` puts the atomic number `Z` in row `1` with the height of one row and from column `1` to *column 2.1*, with the width of $2.1 \times \text{column}$. Note that in this example the two *syntaxes* are mixed up.

The **default cell** of the Periodic Table is constructed with the command:

```
\pgfPTbuildcell(5,3)% 5 rows by 3 columns
[(1;1-2;Z),(1;3;radio),(2-3;1.5-2.5;CS),(4;1-3;name),(5;1-3;Ar)]
```

► Utilization of `\pgfPTresetcell`

The `\pgfPTresetcell` resets the cell to its default layout.

► Utilization of `\pgfPTbuildcellstyle{name}(nrows,ncol...)[entr...]`

The `\pgfPTbuildcellstyle` command works like `\pgfPTbuildcell`, but stores the cell style under the *name* provided. It is only used when called via the *cell style* passed as an option to `\pgfPT`. Otherwise it remains unavailable, unlike the `\pgfPTbuildcell` command which immediately affects the cells of the Periodic Table.

► Utilization of `\pgfPTpreviewcell`

The main purpose of this command is to show the built cell for *debugging*.

With `\pgfPTpreviewcell` you can preview the last unnamed built cell with an optional *scale factor*. If no cells have yet been built, the default cell is shown.

```
\pgfPTpreviewcell
```

Using the last cell built

The build command:

```
\pgfPTbuildcell(5,3)%
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-3;Ar)]
```

	1	2	3
1	Z		radio
2			
3		CS	
4			name
5			Ar

scale 1:1

```
\pgfPTbuildcell(8,3)% 8 rows by 3 columns
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4-5;1-3;name),
(6;1-3;spectra),(7;1-3;DiscC),(8;1-3;DiscY)]
\pgfPTpreviewcell[1.8]
```

Using the last cell built

The build command:

```
\pgfPTbuildcell(8,3)%
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4-5;1-3;name),(6;1-3;spectra),(7;1-3;DiscC),(8;1-3;DiscY)]
```

	1	2	3
1	Z		radio
2			
3		CS	
4			
5		name	
6			
7		spectra	
8		DiscC	
		DiscY	

scale 1.8:1

► Utilization of `\pgfPTpreviewcellstyle{name}`

This previews a *named* cell, again with the optional **scale factor**.

```
\pgfPTpreviewcellstyle{myname}
```

User style **myname** doesn't exist!

```
\pgfPTbuilcellstyle{myname}(5,3)% 5 rows by 3 columns
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-3;Ar*)]
\pgfPTpreviewcellstyle[2]{myname}
```

User style **myname**

The build command:

```
\pgfPTbuildcell(5,3)%
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-3;Ar*)]
```

	1	2	3
1	Z		radio
2			
3		CS	
4		name	
5		Arstar	

scale 2:1

► Utilization of `\pgfPTnewColorScheme{name}[color list]`

Use this command to create a *color scheme* for cells in the Periodic Table. It has two mandatory arguments – **name** and **color list** – and an optional argument – **trailing color**.

The **name** is used to identify the *color scheme*. The **color list** is a comma-separated list of red, green and blue values written as r/g/b, defined in ascending order of Z and starting at Z=1. The optional argument **trailing color** is appended to the end of the list and is used for all cells starting from this point on. It also has the form r/g/b and its default value is 1/1/1 (white).

```
\pgfPTnewColorScheme{myname}{.5/.5/.5,1/0/0,0/1/0,0/0/1}
\pgfPT[back color scheme=myname]
```

Periodic Table of Elements

Periodic Table of Elements showing atomic numbers, symbols, names, and discovery information. The table includes elements from Hydrogen (1) to Oganesson (118). The color scheme is .5/.5/.5,1/0/0,0/1/0,0/0/1. The legend indicates the following color scheme: .5/.5/.5,1/0/0,0/1/0,0/0/1. The legend also includes the following information: Z: Atomic Number, R: Radioactive, CS: Chemical Symbol, N: Name, ES: Emission Spectrum, CD: Country of Discovery, YD: Year of Discovery.

```
\pgfPTnewColorScheme[.25/.25/.25]{myname}{.5/.5/.5,1/0/0,0/1/0,0/0/1}
\pgfPTresetcell
\pgfPT[back color scheme=myname,name color=white, Ar color=white,legend back
color=black!30]
```

Periodic Table of Elements

Periodic Table of Elements showing atomic numbers, symbols, names, and discovery information. The table includes elements from Hydrogen (1) to Oganesson (118). The color scheme is .25/.25/.25,1/0/0,0/1/0,0/0/1. The legend indicates the following color scheme: .25/.25/.25,1/0/0,0/1/0,0/0/1. The legend also includes the following information: Z: Atomic Number, R: Radioactive, CS: Chemical Symbol, N: Name, ES: Emission Spectrum, CD: Country of Discovery, YD: Year of Discovery.

- ✓ **default**, the default built-in color scheme, which is loaded if no value is passed to the **back color scheme** key.
- ✓ **Soft**, a soft color pattern for cells, differentiating metals, non metals, semimetals, lanthanides and actinides.
- ✓ **Jmol**, a color scheme based upon **Jmol: an open-source Java viewer for chemical structures in 3D**.
- ✓ **CPK**, a color scheme that is based upon the colors of the popular plastic spacefilling models which were developed by Corey, Pauling and later improved by Kultun.
- ✓ **Rasmol** and **RasmolNew**, two color schemes based upon the computer program **RasMol**.
- ✓ **Wikipedia**, a color scheme built on the Periodic Table of Elements available at **Wikipedia**.
- ✓ **MNM**, a color pattern which distinguishes between **Metals**, semimetals and **Non Metals**.
- ✓ **PS**, a color scheme depicting the **Physical State** at room temperature.
- ✓ **Radio**, a two color color scheme showing the radioactivity of the elements.
- ✓ **Blocks**, a four colored color scheme showing the *s*, *p*, *d* and *f* blocks of the Periodic Table.

pgf-PeriodicTable ColorScheme Designer

H

Li Be

Na Mg

K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr

Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe

Cs Ba La Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn

Fr Ra Ac Rf Db Sg Bh Hs Mt Ds Rg Cn Nh Fl Mc Lv Ts Og

He

B C N O F Ne

Al Si P S Cl Ar

Br Kr

Se Te I Xe

At Rn

Fr Og

Ce

Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Ni Yb Lu

Th Pa U Np Pu Am Cm Bk Cf Es Fm Md No Lr

Load a Color Scheme:

Choose File

No file chosen

Update Periodic Table

Choose pgfPeriodColorScheme: default Set selected Color Scheme

Name for the Color Scheme: myCSName Write CS to file...

Part of the Chemistry Document Editor

► Utilization of `\pgfPTnewZlist{name}`

```
\pgfPTnewZlist{myZlist}{1,...,57,72,80,81,...,85}
\pgfPT[Z list=myZlist,IUPAC=false]
```

1																	18																																			
1	H hydrogen 1.008																	2	He helium 4.0026																																	
2	3																10																																			
3	Li lithium 6.94	Be beryllium 9.0122															11	Na sodium 22.99	12	Mg magnesium 24.305	13	B boron 10.81	14	C carbon 12.011	15	N nitrogen 14.007	16	O oxygen 15.999	17	F fluorine 18.998	18	Ne neon 20.18																				
4	5																19	K potassium 39.098	20	Ca calcium 40.078	21	Sc scandium 44.956	22	Ti titanium 47.867	23	V vanadium 50.942	24	Cr chromium 51.996	25	Mn manganese 54.938	26	Fe iron 55.845	27	Co cobalt 58.933	28	Ni nickel 58.693	29	Cu copper 63.546	30	Zn zinc 65.38	31	Ga gallium 69.723	32	Ge germanium 72.63	33	As arsenic 74.922	34	Se selenium 78.971	35	Br bromine 79.904	36	Kr krypton 83.798
5	6																37	Rb rubidium 85.468	38	Sr strontium 87.62	39	Y yttrium 88.906	40	Zr zirconium 91.224	41	Nb niobium 92.906	42	Mo molybdenum 95.95	43	Tc technetium [98]	44	Ru ruthenium 101.07	45	Rh rhodium 102.91	46	Pd palladium 106.42	47	Ag silver 107.87	48	Cd cadmium 112.41	49	In indium 114.82	50	Sn tin 118.71	51	Sb antimony 121.76	52	Te tellurium 127.6	53	I iodine 126.9	54	Xe xenon 131.29
6	7																55	Cs caesium 132.91	56	Ba barium 137.33	57	La lanthanum 138.91	58	Hf hafnium 178.49	59											60	Hg mercury 200.59	61	Tl thallium 204.38	62	Pb lead 207.2	63	Bi bismuth 208.98	64	Po polonium [209]	65	At astatine [210]					

► Utilization of `\pgfPTsetLanguage{language flag}`

This command globally changes the default language of the Periodic Table.

```
\pgfPTsetLanguage{pt}
\pgfPT
```

Tabela Periódica dos Elementos

Periodic Table of Elements in Portuguese. The table displays elements with their atomic numbers, symbols, and names in Portuguese. A legend box for Sulfur (S) is provided, showing its atomic number (16), symbol (S), name (Enxofre), and relative atomic mass (32.06).

```
\pgfPTsetLanguage{en}
\pgfPT
```

Periodic Table of Elements

Periodic Table of Elements in English. The table displays elements with their atomic numbers, symbols, and names in English. A legend box for Sulfur (S) is provided, showing its atomic number (16), symbol (S), name (Sulfur), and relative atomic mass (32.06).

cell width

default: 34pt

Sets the width of each base cell of the Periodic Table.

`\pgfPT[Z list={1,...,36},cell width=40pt]`**Periodic Table of Elements**

1	2											13	14	15	16	17	18																		
1	H															2																			
	hydrogen															helium																			
	1.008															4.0026																			
3	4											13	14	15	16	17	18																		
3	Li	4	Be											13	14	15	16	17	18																
	lithium		beryllium																																
	6.94		9.0122																																
11	12											13	14	15	16	17	18																		
11	Na	12	Mg											13	14	15	16	17	18																
	sodium		magnesium																																
	22.99		24.305																																
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36																		
19	K	20	Ca	21	Sc	22	Ti	23	V	24	Cr	25	Mn	26	Fe	27	Co	28	Ni	29	Cu	30	Zn	31	Ga	32	Ge	33	As	34	Se	35	Br	36	Kr
	potassium		calcium		scandium		titanium		vanadium		chromium		manganese		iron		cobalt		nickel		copper		zinc		gallium		germanium		arsenic		selenium		bromine		krypton
	39.098		40.078		44.956		47.867		50.942		51.996		54.938		55.845		58.933		58.693		63.546		65.38		69.723		72.63		74.922		78.971		79.904		83.798

cell height

default: 38.25pt

Sets the height of each base cell of the Periodic Table.

`\pgfPT[Z list={1,...,36},cell height=50pt]`**Periodic Table of Elements**

1	2											13	14	15	16	17	18																		
1	H															2																			
	hydrogen															helium																			
	1.008															4.0026																			
3	4											13	14	15	16	17	18																		
3	Li	4	Be											13	14	15	16	17	18																
	lithium		beryllium																																
	6.94		9.0122																																
11	12											13	14	15	16	17	18																		
11	Na	12	Mg											13	14	15	16	17	18																
	sodium		magnesium																																
	22.99		24.305																																
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36																		
19	K	20	Ca	21	Sc	22	Ti	23	V	24	Cr	25	Mn	26	Fe	27	Co	28	Ni	29	Cu	30	Zn	31	Ga	32	Ge	33	As	34	Se	35	Br	36	Kr
	potassium		calcium		scandium		titanium		vanadium		chromium		manganese		iron		cobalt		nickel		copper		zinc		gallium		germanium		arsenic		selenium		bromine		krypton
	39.098		40.078		44.956		47.867		50.942		51.996		54.938		55.845		58.933		58.693		63.546		65.38		69.723		72.63		74.922		78.971		79.904		83.798

cell size

default: 38.25pt

Style to set both the width and the height of each base cell of the Periodic Table.

`\pgfPT[Z list={1,...,36},cell size=40pt]`**Periodic Table of Elements**

1	2											13	14	15	16	17	18																		
1	H															2																			
	hydrogen															helium																			
	1.008															4.0026																			
3	4											13	14	15	16	17	18																		
3	Li	4	Be											13	14	15	16	17	18																
	lithium		beryllium																																
	6.94		9.0122																																
11	12											13	14	15	16	17	18																		
11	Na	12	Mg											13	14	15	16	17	18																
	sodium		magnesium																																
	22.99		24.305																																
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36																		
19	K	20	Ca	21	Sc	22	Ti	23	V	24	Cr	25	Mn	26	Fe	27	Co	28	Ni	29	Cu	30	Zn	31	Ga	32	Ge	33	As	34	Se	35	Br	36	Kr
	potassium		calcium		scandium		titanium		vanadium		chromium		manganese		iron		cobalt		nickel		copper		zinc		gallium		germanium		arsenic		selenium		bromine		krypton
	39.098		40.078		44.956		47.867		50.942		51.996		54.938		55.845		58.933		58.693		63.546		65.38		69.723		72.63		74.922		78.971		79.904		83.798

celldefault: $\{w=34pt,h=38.25pt,lw=.4pt,lc=black\}$

Pseudo style to set the cell **w**idth, the cell **h**eight, the cell **s**ize, the cell **l**ine **w**idth, the cell **l**ine **c**olor and/or the cell **s**tyle. None of the keys – **w**, **h**, **s**, **lw**, **lc** and **style** – are mandatory.

USAGE: `cell={w=<length>,h=<length>,s=<length>,lw=<length>,lc=<color>,style=<name>}`

`\pgfPT[Z list={1,...,36},cell={w=40pt,h=50pt,lw=.6pt,lc=blue}]`

Periodic Table of Elements

1	2																	18					
1 H hydrogen 1.008	2 He helium 4.0026																	18					
3 Li lithium 6.94	4 Be beryllium 9.0122																	13 B boron 10.81	14 C carbon 12.011	15 N nitrogen 14.007	16 O oxygen 15.999	17 F fluorine 18.998	18 Ne neon 20.18
11 Na sodium 22.99	12 Mg magnesium 24.305																	13 Al aluminum 26.982	14 Si silicon 28.085	15 P phosphorus 30.974	16 S sulfur 32.06	17 Cl chlorine 35.45	18 Ar argon 39.95
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798						

fontdefault: *phv*

Sets the font family, via the proper \LaTeX font name, to use in the Periodic Table. The *default* font is *phv*, i.e., the Helvetica font. The value of the **font** key can be any \LaTeX font name known to the local \LaTeX installation.

See \LaTeX font names below for further details.

`\pgfPT[Z list={1,...,36},font=ptm]`

Periodic Table of Elements

1	2																	18					
1 H hydrogen 1.008	2 He helium 4.0026																	18					
3 Li lithium 6.94	4 Be beryllium 9.0122																	13 B boron 10.81	14 C carbon 12.011	15 N nitrogen 14.007	16 O oxygen 15.999	17 F fluorine 18.998	18 Ne neon 20.18
11 Na sodium 22.99	12 Mg magnesium 24.305																	13 Al aluminum 26.982	14 Si silicon 28.085	15 P phosphorus 30.974	16 S sulfur 32.06	17 Cl chlorine 35.45	18 Ar argon 39.95
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798						

`\pgfPT[Z list={1,...,36},font=RobotoSlab-TLF]`

Periodic Table of Elements

1	2																	18					
1 H hydrogen 1.008	2 He helium 4.0026																	18					
3 Li lithium 6.94	4 Be beryllium 9.0122																	13 B boron 10.81	14 C carbon 12.011	15 N nitrogen 14.007	16 O oxygen 15.999	17 F fluorine 18.998	18 Ne neon 20.18
11 Na sodium 22.99	12 Mg magnesium 24.305																	13 Al aluminum 26.982	14 Si silicon 28.085	15 P phosphorus 30.974	16 S sulfur 32.06	17 Cl chlorine 35.45	18 Ar argon 39.95
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798						

L^AT_EX font names:

✓ The L^AT_EX font names commonly available in L^AT_EX distributions are:

– **Serif fonts**

- ▷ cmr – Computer Modern Roman
- ▷ lmr – Latin Modern Roman
- ▷ pbk – Bookman
- ▷ bch – Charter
- ▷ pnc – New Century Schoolbook
- ▷ ppl – Palatino
- ▷ ptm – Times

– **Sans Serif fonts**

- ▷ cmss – Computer Modern Sans Serif
- ▷ lmss – Latin Modern Sans Serif
- ▷ pag – Avant Garde
- ▷ phv – Helvetica

✓ There are other fonts available to L^AT_EX that require installation of the corresponding packages:

- ▷ the **roboto** package provides the following fonts:
 - Roboto-TLF – Roboto tabular lining
 - Roboto-LF – Roboto proportional lining
 - Roboto-OsF – Roboto proportional oldstyle
 - Roboto-TosF – Roboto tabular oldstyle
 - RobotoSlab-TLF – RobotoSlab proportional lining
 - RobotoSlab-OsF – RobotoSlab proportional oldstyle
 - RobotoSlab-TosF – RobotoSlab tabular oldstyle
 - RobotoMono-TLF – RobotoMono proportional lining
- ▷ the **frcurve** package provides the *frc* – French Cursive font.
- ▷ the **miama** package provides the *fmr* – Miama Nueva font.
- ▷ ...

For more information about fonts visit the [TUG Font Catalogue](#)

back color scheme

default: *default*

Sets a **named** back color scheme for the Periodic Table.

`\pgfPT[back color scheme=Soft]`

Periodic Table of Elements

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 H hydrogen 1.008	2 He helium 4.0026																
3 Li lithium 6.94	4 Be beryllium 9.0122											5 B boron 10.81	6 C carbon 12.011	7 N nitrogen 14.007	8 O oxygen 15.999	9 F fluorine 18.998	10 Ne neon 20.18
11 Na sodium 22.99	12 Mg magnesium 24.305											13 Al aluminum 26.982	14 Si silicon 28.085	15 P phosphorus 30.974	16 S sulfur 32.06	17 Cl chlorine 35.45	18 Ar argon 39.95
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798
37 Rb rubidium 85.468	38 Sr strontium 87.62	39 Y yttrium 88.906	40 Zr zirconium 91.224	41 Nb niobium 92.906	42 Mo molybdenum 95.95	43 Tc technetium [98]	44 Ru ruthenium 101.07	45 Rh rhodium 102.91	46 Pd palladium 106.42	47 Ag silver 107.87	48 Cd cadmium 112.41	49 In indium 114.82	50 Sn tin 118.71	51 Sb antimony 121.76	52 Te tellurium 127.6	53 I iodine 126.9	54 Xe xenon 131.29
55 Cs caesium 132.91	56 Ba barium 137.33	57-71 lanthanoids	72 Hf hafnium 178.49	73 Ta tantalum 180.95	74 W tungsten 183.84	75 Re rhenium 186.21	76 Os osmium 190.23	77 Ir iridium 192.22	78 Pt platinum 195.08	79 Au gold 196.97	80 Hg mercury 200.59	81 Tl thallium 204.38	82 Pb lead 207.2	83 Bi bismuth 208.98	84 Po polonium [209]	85 At astatine [210]	86 Rn radon [222]
87 Fr francium [223]	88 Ra radium [226]	89-103 actinoids	104 Rf rutherfordium [261]	105 Db dubnium [268]	106 Sg seaborgium [266]	107 Bh bohrium [264]	108 Hs hassium [277]	109 Mt meitnerium [268]	110 Ds darmstadtium [281]	111 Rg roentgenium [282]	112 Cn copernicium [285]	113 Nh nihonium [286]	114 Fl flerovium [289]	115 Mc moscovium [290]	116 Lv livermorium [293]	117 Ts tennessine [294]	118 Og oganeson [294]
57 La lanthanum 138.91	58 Ce cerium 140.12	59 Pr praseodymium 140.91	60 Nd neodymium 144.24	61 Pm promethium [145]	62 Sm samarium 150.36	63 Eu europium 151.96	64 Gd gadolinium 157.25	65 Tb terbium 158.93	66 Dy dysprosium 162.5	67 Ho holmium 164.93	68 Er erbium 167.26	69 Tm thulium 168.93	70 Yb ytterbium 173.05	71 Lu lutetium 174.97			
89 Ac actinium [227]	90 Th thorium 232.04	91 Pa protactinium 231.04	92 U uranium 238.03	93 Np neptunium [237]	94 Pu plutonium [244]	95 Am americium [243]	96 Cm curium [247]	97 Bk berkelium [247]	98 Cf californium [251]	99 Es einsteinium [252]	100 Fm fermium [257]	101 Md mendelevium [258]	102 No nobelium [259]	103 Lr lawrencium [260]			

The possible **name** is one of the following:

✓ **built-in:**

- ▷ **'Soft'**, a soft color scheme that distinguishes metal, non metals, silicon and germanium, lanthanoids and actinoids.
- ▷ **'Jmol'**, is the color scheme used in the computer software **Jmol**: an open-source Java viewer for chemical structures in 3D.
- ▷ **'CPK'**, is the color scheme of the popular color convention for distinguishing atoms of different chemical elements in molecular models. The scheme is named after the CPK molecular models designed by chemists Robert Corey and Linus Pauling, and improved by Walter Koltun.
- ▷ **'Rasmol'**, is the color scheme used in the computer software **RasMol**, a program for molecular graphics visualization originally developed by Roger Sayle.
- ▷ **'RasmolNew'**, is a color scheme used in RasMol with revision of CPK colors made by C. Chigbo (RasMol 2.7.3).
- ▷ **'Wikipedia'**, is the color scheme based on the [Wikipedia Periodic Table of Elements](#).
- ▷ **'MNM'**, is designed to show **M**etals and **N**on **M**etals in two different colors, showing also the semi-metals in a third color.
- ▷ **'PS'**, is designed to show the **P**hysical **S**tate of the elements at normal temperature and pressure (NTP) in different colors.
- ▷ **'Radio'**, is designed to show the **R**adioactive elements in one color and the non radioactive elements in another color.
- ▷ **'Blocks'**, for showing the elements in each block of the Periodic Table with the same color.
- ▷ **'solid'**, to show the background of each cell of the Periodic Table with the same color specified by the key **'back color'**.

✓ any **user defined** name via `\pgfPTnewColorScheme{name}[color list]`

back color

default: *white*

Sets the background of each cell of the Periodic Table. It only takes effect if the **back color scheme** key is set to **solid**

`\pgfPT[Z list={1,...,36},back color=black!15]`

Periodic Table of Elements

The image shows a standard periodic table of elements. The first 36 elements (Hydrogen to Krypton) are highlighted with a light gray background, while the remaining elements have a white background. A legend box in the upper left corner shows the element Carbon (C) with its atomic number 6, chemical symbol C, name Carbon, and relative atomic mass 12.011. The legend also indicates that the 'back color' key is set to 'black!15'.

`\pgfPT[Z list={1,...,36},back color scheme=solid,back color=black!15]`

Periodic Table of Elements

The image shows a standard periodic table of elements. The first 36 elements (Hydrogen to Krypton) are highlighted with a solid black background, while the remaining elements have a white background. A legend box in the upper left corner shows the element Carbon (C) with its atomic number 6, chemical symbol C, name Carbon, and relative atomic mass 12.011. The legend also indicates that the 'back color scheme' key is set to 'solid' and the 'back color' key is set to 'black!15'.

It is possible to set the *back color scheme* key with the built-in names using the following styles:

csSolid

default: white

A style equivalent to `back color scheme=solid,back color=#1`

\pgfPT[csSolid]

Periodic Table of Elements

1

H

hydrogen

1.008

2

3

Li

lithium

6.94

4

Be

beryllium

9.0122

5

Na

sodium

22.99

6

Mg

magnesium

24.305

7

K

potassium

39.098

8

Ca

calcium

40.078

9

Sc

scandium

44.956

10

Ti

titanium

47.867

11

V

vanadium

50.942

12

Cr

chromium

51.996

13

Mn

manganese

54.938

14

Fe

iron

55.845

15

Co

cobalt

58.933

16

Ni

nickel

58.693

17

Cu

copper

63.546

18

Zn

zinc

65.38

19

Ga

gallium

69.723

20

Ge

germanium

72.63

21

As

arsenic

74.922

22

Se

selenium

78.971

23

Br

bromine

79.904

24

Kr

krypton

83.798

25

Rb

rubidium

85.468

26

Sr

strontium

87.62

27

Y

yttrium

88.906

28

Zr

zirconium

91.224

29

Nb

niobium

92.906

30

Mo

molybdenum

95.95

31

Tc

technetium

[98]

32

Ru

ruthenium

101.07

33

Rh

rhodium

102.91

34

Pd

palladium

106.42

35

Ag

silver

107.87

36

Cd

cadmium

112.41

37

In

indium

114.82

38

Sn

antimony

118.71

39

Sb

antimony

121.76

40

Te

tellurium

127.6

41

I

iodine

126.9

42

Xe

xenon

131.29

43

Cs

caesium

132.91

44

Ba

barium

137.33

45

lanthanoids

46

Hf

hafnium

178.49

47

Ta

tantalum

180.95

48

W

tungsten

183.84

49

Re

rhenium

186.21

50

Os

osmium

190.23

51

Ir

iridium

192.22

52

Pt

platinum

195.08

53

Au

gold

196.97

54

Hg

mercury

200.59

55

Tl

thallium

204.38

56

Pb

lead

207.2

57

Bi

bismuth

208.98

58

Po

polonium

[209]

59

At

astatine

[210]

60

Rn

radon

[222]

61

Fr

francium

[223]

62

Ra

radium

[226]

63

actinoids

64

Rf

rutherfordium

[261]

65

Db

dbnium

[268]

66

Sg

seaborgium

[269]

67

Bh

bohrium

[270]

68

Hs

hassium

[270]

69

Mt

meitnerium

[278]

70

Ds

darmstadtium

[281]

71

Rg

roentgenium

[282]

72

Cn

coppernium

[285]

73

Nh

nihonium

[286]

74

Fl

flerovium

[289]

75

Mc

moscovium

[290]

76

Lv

livermorium

[293]

77

Ts

tennessine

[294]

78

Og

oganesson

[294]

79

80

La

lanthanum

138.91

81

Ce

cerium

140.12

82

Pr

praseodymium

140.91

83

Nd

neodymium

144.24

84

Pm

promethium

[145]

85

Sm

samarium

150.36

86

Eu

europium

151.96

87

Gd

gadolinium

157.25

88

Tb

terbium

158.93

89

Dy

dysprosium

162.5

90

Ho

holmium

164.93

91

Er

erbium

167.26

92

Tm

thulium

168.93

93

Yb

ytterbium

173.05

94

Lu

lutetium

174.97

95

Ac

actinium

227.03

96

Th

thorium

232.04

97

Pa

protactinium

231.04

98

U

uranium

238.03

99

Np

neptunium

237.05

100

Pu

plutonium

244.06

101

Am

americium

243.06

102

Cm

curium

247.07

103

Bk

berkelium

247.07

104

Cf

californium

251.08

105

Es

einsteinium

252.08

106

Fm

fermium

257.10

107

Md

mendelevium

258.10

108

No

nobelium

259.10

109

Lr

lawrencium

262.10

2

CS

N

Ar

radioactive

chemical symbol

name

relative atomic mass

Z: Atomic Number

Rs: Radioactive

N: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

\pgfPT[csSolid=black!15]

Periodic Table of Elements

1

H

hydrogen

1.008

2

3

Li

lithium

6.94

4

Be

beryllium

9.0122

5

Na

sodium

22.99

6

Mg

magnesium

24.305

7

K

potassium

39.098

8

Ca

calcium

40.078

9

Sc

scandium

44.956

10

Ti

titanium

47.867

11

V

vanadium

50.942

12

Cr

chromium

51.996

13

Mn

manganese

54.938

14

Fe

iron

55.845

15

Co

cobalt

58.933

16

Ni

nickel

58.693

17

Cu

copper

63.546

18

Zn

zinc

65.38

19

Ga

gallium

69.723

20

Ge

germanium

72.63

21

As

arsenic

74.922

22

Se

selenium

78.971

23

Br

bromine

79.904

24

Kr

krypton

83.798

25

Rb

rubidium

85.468

26

Sr

strontium

87.62

27

Y

yttrium

88.906

28

Zr

zirconium

91.224

29

Nb

niobium

92.906

30

Mo

molybdenum

95.95

31

Tc

technetium

[98]

32

Ru

ruthenium

101.07

33

Rh

rhodium

102.91

34

Pd

palladium

106.42

35

Ag

silver

107.87

36

Cd

cadmium

112.41

37

In

indium

114.82

38

Sn

tin

118.71

39

Sb

antimony

121.76

40

Te

tellurium

127.6

41

I

iodine

126.9

42

Xe

xenon

131.29

43

Cs

caesium

132.91

44

Ba

barium

137.33

45

lanthanoids

46

Hf

hafnium

178.49

47

Ta

tantalum

180.95

48

W

tungsten

183.84

49

Re

rhenium

186.21

50

Os

osmium

190.58

51

Ir

iridium

192.22

52

Pt

platinum

195.08

53

Au

gold

196.97

54

Hg

mercury

200.59

55

Tl

thallium

204.38

56

Pb

lead

207.2

57

Bi

bismuth

208.98

58

Po

polonium

[209]

59

At

astatine

[210]

60

Rn

radon

[222]

61

Fr

francium

[223]

62

Ra

radium

[226]

63

actinoids

64

Rf

rutherfordium

[261]

65

Db

dubnium

[268]

66

Sg

seaborgium

[269]

67

Bh

bohrium

[270]

68

Hs

hassium

[270]

69

Mt

meitnerium

[278]

70

Ds

darmstadtium

[281]

71

Rg

roentgenium

[282]

72

Cn

coppernium

[285]

73

Nh

nihonium

[286]

74

Fl

flerovium

[289]

75

Mc

moscovium

[290]

76

Lv

livermorium

[293]

77

Ts

tennessine

[294]

78

Og

oganesson

[294]

2

Ra

CS

N

Ar

radioactive

chemical symbol

name

relative atomic mass

Z: Atomic Number

Ra: Radioactive

CS: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

57

La

lanthanum

138.91

58

Ce

cerium

140.12

59

Pr

praseodymium

140.91

60

Nd

neodymium

144.24

61

Pm

promethium

[145]

62

Sm

samarium

150.36

63

Eu

europium

151.96

64

Gd

gadolinium

157.25

65

Tb

terbium

158.93

66

Dy

dysprosium

162.5

67

Ho

holmium

164.93

68

Er

erbium

167.26

69

Tm

thulium

168.93

70

Yb

ytterbium

173.05

71

Lu

lutetium

174.97

72

Ac

actinium

227.03

73

Th

thorium

232.04

74

Pa

protactinium

231.04

75

U

uranium

238.03

76

Np

neptunium

237.05

77

Pu

plutonium

244.06

78

Am

americium

243.06

79

Cm

curium

247.07

80

Bk

berkelium

247.07

81

Cf

californium

251.08

82

Es

einsteinium

252.08

83

Fm

fermium

257.10

84

Md

mendelevium

258.10

85

No

nobelium

259.10

86

Lr

lawrencium

262.10

csSoft*no value*A style equivalent to `back color scheme=Soft`

\pgfPT[csSoft]

Periodic Table of Elements

Periodic Table of Elements (csSoft style)

Legend:

- Z: Atomic Number
- R: Radioactive
- CS: Chemical Symbol
- N: Name
- Ar: Relative Atomic Mass

Elements shown include: H, He, Li, Be, B, C, N, O, F, Ne, Na, Mg, Al, Si, P, S, Cl, Ar, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Kr, Rb, Sr, Y, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Ag, Cd, In, Sn, Sb, Te, I, Xe, Cs, Ba, La, Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg, Tl, Pb, Bi, Po, At, Rn, Fr, Ra, Ac, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr, and many others.

csJmol*no value*A style equivalent to `back color scheme=Jmol`

\pgfPT[csJmol]

Periodic Table of Elements

Periodic Table of Elements (csJmol style)

Legend:

- Z: Atomic Number
- R: Radioactive
- CS: Chemical Symbol
- N: Name
- Ar: Relative Atomic Mass

Elements shown include: H, He, Li, Be, B, C, N, O, F, Ne, Na, Mg, Al, Si, P, S, Cl, Ar, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Kr, Rb, Sr, Y, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Ag, Cd, In, Sn, Sb, Te, I, Xe, Cs, Ba, La, Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg, Tl, Pb, Bi, Po, At, Rn, Fr, Ra, Ac, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr, and many others.

csCPK

no value

A style equivalent to `back color scheme=CPK`

\pgfPT[csCPK]

Periodic Table of Elements

Legend: Z: Atomic Number, R: Radioactive, CS: Chemical Symbol, N: Name, Ar: Relative Atomic Mass

csRasmol

no value

A style equivalent to `back color scheme=Rasmol`

\pgfPT[csRasmol]

Periodic Table of Elements

Legend: Z: Atomic Number, R: Radioactive, CS: Chemical Symbol, N: Name, Ar: Relative Atomic Mass

csRasmolNew*no value*A style equivalent to `back color scheme=RasmolNew``\pgfPT[csRasmolNew]`

Periodic Table of Elements

Legend box:

- Z: Atomic Number
- CS: Radioactive
- N: Chemical Symbol
- Ar: Relative Atomic Mass

Table structure: 7 rows, 18 columns. Elements are color-coded by groups. Lanthanides and Actinides are shown below the main table.

csWikipedia*no value*A style equivalent to `back color scheme=Wikipedia``\pgfPT[csWikipedia]`

Periodic Table of Elements

Legend box:

- Z: Atomic Number
- CS: Radioactive
- N: Chemical Symbol
- Ar: Relative Atomic Mass

Table structure: 7 rows, 18 columns. Elements are color-coded by groups. Lanthanides and Actinides are shown below the main table.

csMNM*no value*A style equivalent to **back color scheme=MNM**

\pgfPT[csMNM]

Periodic Table of Elements

1																	2	
1 H hydrogen 1.008																	2 He helium 4.0026	
3 Li lithium 6.94	4 Be beryllium 9.0122																	
5 Na sodium 22.99	6 Mg magnesium 24.305																	
<div><div><div>3 CS ⊕</div><div>4 Ra</div><div>radioactive chemical symbol relative atomic mass</div></div><div><div>Z: Atomic Number Ra: Radioactive C.S.: Chemical Symbol A: Name Ar: Relative Atomic Mass</div></div></div>																		
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798	
37 Rb rubidium 85.468	38 Sr strontium 87.62	39 Y yttrium 88.906	40 Zr zirconium 91.224	41 Nb niobium 92.906	42 Mo molybdenum 95.95	43 Tc technetium [98]	44 Ru ruthenium 101.07	45 Rh rhodium 102.91	46 Pd palladium 106.42	47 Ag silver 107.87	48 Cd cadmium 112.41	49 In indium 114.82	50 Sn tin 118.71	51 Sb antimony 121.76	52 Te tellurium 127.6	53 I iodine 126.9	54 Xe xenon 131.29	
55 Cs caesium 132.91	56 Ba barium 137.33	57-71 lanthanoids		72 Hf hafnium 178.49	73 Ta tantalum 180.95	74 W tungsten 183.84	75 Re rhenium 186.21	76 Os osmium 190.23	77 Ir iridium 192.22	78 Pt platinum 195.08	79 Au gold 196.97	80 Hg mercury 200.59	81 Tl thallium 204.38	82 Pb lead 207.2	83 Bi bismuth 208.98	84 Po polonium [209]	85 At astatine [210]	86 Rn radon [222]
87 Fr francium [223]	88 Ra radium [226]	89-103 actinoids		104 Rf rutherfordium [267]	105 Db dubnium [268]	106 Sg seaborgium [269]	107 Bh bohrium [270]	108 Hs hassium [270]	109 Mt meitnerium [278]	110 Ds darmstadtium [281]	111 Rg roentgenium [282]	112 Cn copernicium [285]	113 Nh nihonium [286]	114 Fl flerovium [289]	115 Mc moscovium [290]	116 Lv livermorium [293]	117 Ts tennessine [294]	118 Og oganeson [294]
57 La lanthanum 138.91	58 Ce cerium 140.12	59 Pr praseodymium 140.91	60 Nd neodymium 144.24	61 Pm promethium [145]	62 Sm samarium 150.36	63 Eu europium 151.96	64 Gd gadolinium 157.25	65 Tb terbium 158.93	66 Dy dysprosium 162.5	67 Ho holmium 164.93	68 Er erbium 167.26	69 Tm thulium 168.93	70 Yb ytterbium 173.05	71 Lu lutetium 174.97				
89 Ac actinium [227]	90 Th thorium 232.04	91 Pa protactinium 231.04	92 U uranium 238.03	93 Np neptunium [237]	94 Pu plutonium [244]	95 Am americium [243]	96 Cm curium [247]	97 Bk berkelium [247]	98 Cf californium [251]	99 Es einsteinium [252]	100 Fm fermium [257]	101 Md mendelevium [258]	102 No nobelium [259]	103 Lr lawrencium [260]				

csPS*no value*A style equivalent to **back color scheme=PS**

\pgfPT[csPS]

Periodic Table of Elements

<div><div>1</div><div><div>2</div><div><div>Ra</div><div><div>CS</div><div><div>+</div></div></div><div><div>N</div><div>Ar</div></div></div><div><div>radioactive</div><div>chemical symbol</div><div>name</div><div>relative atomic mass</div></div></div></div>																		2				
1																	2					
1	H																	He				
	hydrogen																	helium				
	1.008																	4.0026				
2	Li	Be															Nb					
	lithium	beryllium															niobium					
	6.94	9.0122															92.90638					
3	Na	Mg															Al	Si	P	S	Cl	Ar
	sodium	magnesium															aluminum	silicon	phosphorus	sulfur	chlorine	argon
	22.99	24.305															26.981538	28.08558	30.973762	32.06	35.453	39.948
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr				
	potassium	calcium	scandium	titanium	vanadium	chromium	manganese	iron	cobalt	nickel	copper	zinc	gallium	germanium	arsenic	selenium	bromine	krypton				
	39.0983	40.078	44.955912	47.867	50.9415	51.9961	54.938045	55.845	58.933195	58.6934	63.546	65.38	69.723	72.63	74.9216	78.9718	79.904	83.798				
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe				
	rubidium	strontium	yttrium	zirconium	niobium	molybdenum	technetium	ruthenium	rhodium	palladium	silver	cadmium	indium	tin	antimony	tellurium	iodine	xenon				
	85.468	87.62	88.906	91.224	92.906	95.95	[98]	101.07	102.91	106.42	107.87	112.41	114.82	117.71	121.76	127.6	126.9	131.29				
6	Cs	Ba	La		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn			
	caesium	barium	lanthanoids		hafnium	tantalum	tungsten	rhenium	osmium	iridium	platinum	gold	mercury	thallium	lead	bismuth	polonium	astatine	radon			
	132.91	137.33			178.49	180.95	183.84	186.21	190.23	192.22	195.08	196.97	200.59	204.38	207.2	208.98	[209]	[210]	[222]			
7	Fr	Ra	Ac		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og			
	francium	radium	actinoids		rutherfordium	dubnium	seaborgium	bohrium	hassium	meitnerium	darmstadtium	roentgenium	copernicium	nihonium	flerovium	moscovium	livermorium	tennessine	oganeson			
	[223]	[226]			[267]	[268]	[269]	[270]	[270]	[278]	[281]	[282]	[285]	[286]	[289]	[290]	[293]	[294]	[294]			
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csRadio

no value

A style equivalent to `back color scheme=Radio`

\pgfPT[csRadio]

Periodic Table of Elements

The periodic table is displayed with a light blue background. Elements are color-coded by groups: Group 1 (H, Li, Na, K, Rb, Cs, Fr) is light blue; Group 2 (Be, Mg, Ca, Sr, Ba, Ra) is light green; Groups 3-10 (Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Kr) are light yellow; Groups 11-12 (Ag, Cd, In, Sn, Sb, Te, I, Xe) are light green; Groups 13-18 (B, C, N, O, F, Ne, Al, Si, P, S, Cl, Ar, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Kr) are light blue. The lanthanide and actinide series are shown below the main table, with lanthanides in light blue and actinides in light green. A legend box in the top left corner defines the symbols: Z: Atomic Number, R: Radioactive, CS: Chemical Symbol, N: Name, Ar: Relative Atomic Mass.

csBlocks

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A style equivalent to `back color scheme=Blocks`

\pgfPT[csBlocks]

Periodic Table of Elements

The periodic table is displayed with a light blue background. Elements are color-coded by groups: Group 1 (H, Li, Na, K, Rb, Cs, Fr) is light blue; Group 2 (Be, Mg, Ca, Sr, Ba, Ra) is light green; Groups 3-10 (Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Kr) are light yellow; Groups 11-12 (Ag, Cd, In, Sn, Sb, Te, I, Xe) are light green; Groups 13-18 (B, C, N, O, F, Ne, Al, Si, P, S, Cl, Ar, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Kr) are light blue. The lanthanide and actinide series are shown below the main table, with lanthanides in light blue and actinides in light green. A legend box in the top left corner defines the symbols: Z: Atomic Number, R: Radioactive, CS: Chemical Symbol, N: Name, Ar: Relative Atomic Mass.

background

default: {}

A style to set the background of the Periodic Table, built with any of the `TikZ` keys that can be applied to a path construction.

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\pgfPT[background={draw=red,line width=2pt,fill=red!10}]
```

Periodic Table of Elements

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\usetikzlibrary{shadows}
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\pgfPT[background={left color=red!10,right color=green!10,postaction={drop shadow={left color=red!10,right color=green!10}}}]
```

Periodic Table of Elements

IUPACdefault: *true*

When set to true draws the periodic table with *lanthanum* and *actinium* appended to block f and the labels *lanthanoids* and *actinoids* are placed at group 3, substituting *lanthanum* and *actinium*. When **IUPAC** is set to false, *lanthanum* and *actinium* are shown in group 3 and the labels *lanthanoids* and *actinoids* are placed near the *f* block (if the key **show label LaAc** is set to true).

\pgfPT

Periodic Table of Elements

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1	H hydrogen 1.008																	2	He helium 4.0026																
2	3	4											5	6	7	8	9	10																	
3	Li lithium 6.94	4	Be beryllium 9.0122											5	B boron 10.81	6	C carbon 12.011	7	N nitrogen 14.007	8	O oxygen 15.999	9	F fluorine 18.998	10	Ne neon 20.18										
11	Na sodium 22.99	12	Mg magnesium 24.305											13	Al aluminum 26.982	14	Si silicon 28.085	15	P phosphorus 30.974	16	S sulfur 32.06	17	Cl chlorine 35.45	18	Ar argon 39.95										
19	K potassium 39.098	20	Ca calcium 40.078	21	Sc scandium 44.956	22	Ti titanium 47.867	23	V vanadium 50.942	24	Cr chromium 51.996	25	Mn manganese 54.938	26	Fe iron 55.845	27	Co cobalt 58.933	28	Ni nickel 58.693	29	Cu copper 63.546	30	Zn zinc 65.38	31	Ga gallium 69.723	32	Ge germanium 72.63	33	As arsenic 74.922	34	Se selenium 78.971	35	Br bromine 79.904	36	Kr krypton 83.798
37	Rb rubidium 85.468	38	Sr strontium 87.62	39	Y yttrium 88.906	40	Zr zirconium 91.224	41	Nb niobium 92.906	42	Mo molybdenum 95.95	43	Tc technetium [98]	44	Ru ruthenium 101.07	45	Rh rhodium 102.91	46	Pd palladium 106.42	47	Ag silver 107.87	48	Cd cadmium 112.41	49	In indium 114.82	50	Sn tin 118.71	51	Sb antimony 121.76	52	Te tellurium 127.6	53	I iodine 126.9	54	Xe xenon 131.29
55	Cs caesium 132.91	56	Ba barium 137.33	57-71	lanthanoids	72	Hf hafnium 178.49	73	Ta tantalum 180.95	74	W tungsten 183.84	75	Re rhenium 186.21	76	Os osmium 190.23	77	Ir iridium 192.22	78	Pt platinum 195.08	79	Au gold 196.97	80	Hg mercury 200.59	81	Tl thallium 204.38	82	Pb lead 207.2	83	Bi bismuth 208.98	84	Po polonium [209]	85	At astatine [210]	86	Rn radon [222]
87	Fr francium [223]	88	Ra radium [226]	89-103	actinoids	104	Rf rutherfordium [267]	105	Db dubnium [268]	106	Sg seaborgium [269]	107	Bh bohrium [270]	108	Hs hassium [271]	109	Mt meitnerium [272]	110	Ds darmstadtium [281]	111	Rg roentgenium [282]	112	Cn copernicium [285]	113	Nh nihonium [286]	114	Fl flerovium [289]	115	Mc moscovium [290]	116	Lv livermorium [293]	117	Ts tennessine [294]	118	Og oganeson [294]
57	La lanthanum 138.91	58	Ce cerium 140.12	59	Pr praseodymium 140.91	60	Nd neodymium 144.24	61	Pm promethium [145]	62	Sm samarium 150.36	63	Eu europium 151.96	64	Gd gadolinium 157.25	65	Tb terbium 158.93	66	Dy dysprosium 162.5	67	Ho holmium 164.93	68	Er erbium 167.26	69	Tm thulium 168.93	70	Yb ytterbium 173.05	71	Lu lutetium 174.97						
89	Ac actinium [227]	90	Th thorium 232.04	91	Pa protactinium 231.04	92	U uranium 238.03	93	Np neptunium [237]	94	Pu plutonium [244]	95	Am americium [243]	96	Cm curium [247]	97	Bk berkelium [247]	98	Cf californium [251]	99	Es einsteinium [252]	100	Fm fermium [257]	101	Md mendelevium [258]	102	No nobelium [259]	103	Lr lawrencium [260]						

\pgfPT[IUPAC=false]

Periodic Table of Elements

1																	18																																																									
1	H hydrogen 1.008																	2	He helium 4.0026																																																							
2	Li lithium 6.94	Be beryllium 9.0122															10	Ne neon 20.18																																																								
3	Na sodium 22.99	Mg magnesium 24.305															18	Ar argon 39.95																																																								
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5	Rb rubidium 85.468	Sr strontium 87.62	Y yttrium 88.906	Zr zirconium 91.224	Nb niobium 92.906	Mo molybdenum 95.95	Tc technetium [98]	Ru ruthenium 101.07	Rh rhodium 102.91	Pd palladium 106.42	Ag silver 107.87	Cd cadmium 112.41	In indium 114.82	Sn tin 118.71	Sb antimony 121.76	Te tellurium 127.6	I iodine 126.9	Xe xenon 131.29																																																								
6	Cs caesium 132.91	Ba barium 137.33	La lanthanum 138.91	Hf hafnium 178.49	Ta tantalum 180.95	W tungsten 183.84	Re rhenium 186.21	Os osmium 190.23	Ir iridium 192.22	Pt platinum 195.08	Au gold 196.97	Hg mercury 200.59	Tl thallium 204.38	Pb lead 207.2	Bi bismuth 208.98	Po polonium [209]	At astatine [210]	Rn radon [222]																																																								
7	Fr francium [223]	Ra radium [226]	Ac actinium [227]	Th thorium 232.04	Pa protactinium 231.04	U uranium 238.03	Np neptunium [237]	Pu plutonium [244]	Am americium [243]	Cm curium [247]	Bk berkelium [247]	Cf californium [251]	Es einsteinium [252]	Fm fermium [257]	Md mendelevium [258]	No nobelium [259]	Lr lawrencium [260]	Og oganesson [294]																																																								
<div>lanthanoids</div> <table><tr><td>58</td><td>Ce cerium 140.12</td><td>59</td><td>Pr praseodymium 140.91</td><td>60</td><td>Nd neodymium 144.24</td><td>61</td><td>Pm promethium [145]</td><td>62</td><td>Sm samarium 150.36</td><td>63</td><td>Eu europium 151.96</td><td>64</td><td>Gd gadolinium 157.25</td><td>65</td><td>Tb terbium 158.93</td><td>66</td><td>Dy dysprosium 162.5</td><td>67</td><td>Ho holmium 164.93</td><td>68</td><td>Er erbium 167.26</td><td>69</td><td>Tm thulium 168.93</td><td>70</td><td>Yb ytterbium 173.05</td><td>71</td><td>Lu lutetium 174.97</td></tr></table> <div>actinoids</div> <table><tr><td>90</td><td>Th thorium 232.04</td><td>91</td><td>Pa protactinium 231.04</td><td>92</td><td>U uranium 238.03</td><td>93</td><td>Np neptunium [237]</td><td>94</td><td>Pu plutonium [244]</td><td>95</td><td>Am americium [243]</td><td>96</td><td>Cm curium [247]</td><td>97</td><td>Bk berkelium [247]</td><td>98</td><td>Cf californium [251]</td><td>99</td><td>Es einsteinium [252]</td><td>100</td><td>Fm fermium [257]</td><td>101</td><td>Md mendelevium [258]</td><td>102</td><td>No nobelium [259]</td><td>103</td><td>Lr lawrencium [260]</td></tr></table>																			58	Ce cerium 140.12	59	Pr praseodymium 140.91	60	Nd neodymium 144.24	61	Pm promethium [145]	62	Sm samarium 150.36	63	Eu europium 151.96	64	Gd gadolinium 157.25	65	Tb terbium 158.93	66	Dy dysprosium 162.5	67	Ho holmium 164.93	68	Er erbium 167.26	69	Tm thulium 168.93	70	Yb ytterbium 173.05	71	Lu lutetium 174.97	90	Th thorium 232.04	91	Pa protactinium 231.04	92	U uranium 238.03	93	Np neptunium [237]	94	Pu plutonium [244]	95	Am americium [243]	96	Cm curium [247]	97	Bk berkelium [247]	98	Cf californium [251]	99	Es einsteinium [252]	100	Fm fermium [257]	101	Md mendelevium [258]	102	No nobelium [259]	103	Lr lawrencium [260]
58	Ce cerium 140.12	59	Pr praseodymium 140.91	60	Nd neodymium 144.24	61	Pm promethium [145]	62	Sm samarium 150.36	63	Eu europium 151.96	64	Gd gadolinium 157.25	65	Tb terbium 158.93	66	Dy dysprosium 162.5	67	Ho holmium 164.93	68	Er erbium 167.26	69	Tm thulium 168.93	70	Yb ytterbium 173.05	71	Lu lutetium 174.97																																															
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show label LaAc

default: {}

Determines when the labels 'lanthanoids' and 'actinoids' are shown (**true**) or not shown (**false**) near the f block. When the **IUPAC** key is set to true, the default behavior is to show the labels and when the **IUPAC** key is set to false, the default behavior is to hide the labels. This *default behavior can be overridden by this key* setting it to true, to show the labels, or to false to hide them, independently of the value of the **IUPAC** key.

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\pgfPTnewZlist{myZlist}{55,...,118}
\pgfPTstyle[show title=false,show legend=false,show group numbers=false]
\pgfPT[Z list=myZlist]
```

6	55	56	57-71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
	Cs	Ba	lanthanoids	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
	caesium 132.91	barium 137.33		hafnium 178.49	tantalum 180.95	tungsten 183.84	rhenium 186.21	osmium 190.23	iridium 192.22	platinum 195.08	gold 196.97	mercury 200.59	thallium 204.38	lead 207.2	bismuth 208.98	polonium [209]	astatine [210]	radon [222]
7	87	88	89-103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
	Fr	Ra	actinoids	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og
	francium [223]	radium [226]		rutherfordium [267]	dubnium [268]	seaborgium [269]	bohrium [270]	hassium [271]	meitnerium [272]	darmstadtium [281]	roentgenium [282]	copernicium [285]	nihonium [286]	flerovium [289]	moscovium [290]	livermorium [293]	tennessine [294]	oganeson [294]

6	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
	lanthanum 138.91	cerium 140.12	praseodymium 140.91	neodymium 144.24	promethium [145]	samarium 150.36	euporium 151.96	gadolinium 157.25	terbium 158.93	dysprosium 162.5	holmium 164.93	erbium 167.26	thulium 168.93	ytterbium 173.05	lutetium 174.97
7	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103
	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
	actinium [227]	thorium 232.04	protactinium 231.04	uranium 238.03	neptunium [237]	plutonium [244]	americium [243]	curium [247]	berkelium [247]	californium [251]	einsteinium [252]	fermium [257]	mendelevium [258]	nobelium [259]	lawrencium [261]

```
\pgfPT[Z list=myZlist,show label LaAc=true]
```

6	55	56	57-71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
	Cs	Ba	lanthanoids	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
	caesium 132.91	barium 137.33		hafnium 178.49	tantalum 180.95	tungsten 183.84	rhenium 186.21	osmium 190.23	iridium 192.22	platinum 195.08	gold 196.97	mercury 200.59	thallium 204.38	lead 207.2	bismuth 208.98	polonium [209]	astatine [210]	radon [222]
7	87	88	89-103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
	Fr	Ra	actinoids	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og
	francium [223]	radium [226]		rutherfordium [267]	dubnium [268]	seaborgium [269]	bohrium [270]	hassium [271]	meitnerium [272]	darmstadtium [281]	roentgenium [282]	copernicium [285]	nihonium [286]	flerovium [289]	moscovium [290]	livermorium [293]	tennessine [294]	oganeson [294]

lanthanoids		57	58	60		61	62	63	64	65	66	67	68	69	71	
6		La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
		lanthanum 138.91	cerium 140.12	praseodymium 140.91	neodymium 144.24	promethium [145]	samarium 150.36	euporium 151.96	gadolinium 157.25	terbium 158.93	dysprosium 162.5	holmium 164.93	erbium 167.26	thulium 168.93	ytterbium 173.05	lutetium 174.97
actinoids		89	90	91	92	93	94	95	96	97	98	99	100	101	102	103
7		Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
		actinium [227]	thorium 232.04	protactinium 231.04	uranium 238.03	neptunium [237]	plutonium [244]	americium [243]	curium [247]	berkelium [247]	californium [251]	einsteinium [252]	fermium [257]	mendelevium [258]	nobelium [259]	lawrencium [261]

```
\pgfPT[Z list=myZlist,IUPAC=false]
```

6	55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
	Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
	caesium 132.91	barium 137.33	lanthanum 138.91	hafnium 178.49	tantalum 180.95	tungsten 183.84	rhenium 186.21	osmium 190.23	iridium 192.22	platinum 195.08	gold 196.97	mercury 200.59	thallium 204.38	lead 207.2	bismuth 208.98	polonium [209]	astatine [210]	radon [222]
7	87	88	89	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
	Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og
	francium [223]	radium [226]	actinium [227]	rutherfordium [267]	dubnium [268]	seaborgium [269]	bohrium [270]	hassium [271]	meitnerium [272]	darmstadtium [281]	roentgenium [282]	copernicium [285]	nihonium [286]	flerovium [289]	moscovium [290]	livermorium [293]	tennessine [294]	oganeson [294]

lanthanoids		58	59	60	61	62	63	64	65	66	67	68	69	70	71
6		Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
		cerium 140.12	praseodymium 140.91	neodymium 144.24	promethium [145]	samarium 150.36	euporium 151.96	gadolinium 157.25	terbium 158.93	dysprosium 162.5	holmium 164.93	erbium 167.26	thulium 168.93	ytterbium 173.05	lutetium 174.97
actinoids		90	91	92	93	94	95	96	97	98	99	100	101	102	103
7		Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
		thorium 232.04	protactinium 231.04	uranium 238.03	neptunium [237]	plutonium [244]	americium [243]	curium [247]	berkelium [247]	californium [251]	einsteinium [252]	fermium [257]	mendelevium [258]	nobelium [259]	lawrencium [261]

```
\pgfPT[Z list=myZlist,IUPAC=false,show label LaAc=false]
```

6	55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
	Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
	caesium 132.91	barium 137.33	lanthanum 138.91	hafnium 178.49	tantalum 180.95	tungsten 183.84	rhenium 186.21	osmium 190.23	iridium 192.22	platinum 195.08	gold 196.97	mercury 200.59	thallium 204.38	lead 207.2	bismuth 208.98	polonium [209]	astatine [210]	radon [222]
7	87	88	89	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
	Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og
	francium [223]	radium [226]	actinium [227]	rutherfordium [267]	dubnium [268]	seaborgium [269]	bohrium [270]	hassium [271]	meitnerium [272]	darmstadtium [281]	roentgenium [282]	copernicium [285]	nihonium [286]	flerovium [289]	moscovium [290]	livermorium [293]	tennessine [294]	oganeson [294]

6	58	59	60	61	62	63	64	65	66	67	68	69	70	71
	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
	cerium 140.12	praseodymium 140.91	neodymium 144.24	promethium [145]	samarium 150.36	euporium 151.96	gadolinium 157.25	terbium 158.93	dysprosium 162.5	holmium 164.93	erbium 167.26	thulium 168.93	ytterbium 173.05	lutetium 174.97
7	90	91	92	93	94	95	96	97	98	99	100	101	102	103
	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
	thorium 232.04	protactinium 231.04	uranium 238.03	neptunium [237]	plutonium [244]	americium [243]	curium [247]	berkelium [247]	californium [251]	einsteinium [252]	fermium [257]	mendelevium [258]	nobelium [259]	lawrencium [261]

label LaAc fontdefault: `\footnotesize\itshape`

Sets the font for the labels 'lanthanoids' and 'actinoids'.

`\pgfPT[label LaAc font=\bfseries,Z list=myZlist,IUPAC=false]`

6	55 Ce caesium 132.91	56 Ba barium 137.33	57 La lanthanum 138.91	72 Hf hafnium 178.49	73 Ta tantalum 180.95	74 W tungsten 183.84	75 Re rhenium 186.21	76 Os osmium 190.23	77 Ir iridium 192.22	78 Pt platinum 195.08	79 Au gold 196.97	80 Hg mercury 200.59	81 Tl thallium 204.38	82 Pb lead 207.2	83 Bi bismuth 208.98	84 Po polonium (209)	85 At astatine (210)	86 Rn radon (222)
7	87 Fr francium (223)	88 Ra radium (226)	89 Ac actinium (227)	104 Rf rutherfordium (261)	105 Db dubnium (268)	106 Sg seaborgium (269)	107 Bh bohrium (270)	108 Hs hassium (271)	109 Mt meitnerium (272)	110 Ds darmstadtium (281)	111 Rg roentgenium (282)	112 Cn copernicium (285)	113 Nh nihonium (286)	114 Fl flerovium (289)	115 Mc moscovium (290)	116 Lv livermorium (293)	117 Ts tennessine (294)	118 Og oganesson (294)

lanthanoids	58 Ce cerium 140.12	59 Pr praseodymium 140.91	60 Nd neodymium 144.24	61 Pm promethium (145)	62 Sm samarium 150.36	63 Eu europium 151.96	64 Gd gadolinium 157.25	65 Tb terbium 158.93	66 Dy dysprosium 162.5	67 Ho holmium 164.93	68 Er erbium 167.26	69 Tm thulium 168.93	70 Yb ytterbium 173.05	71 Lu lutetium 174.97
actinoids	90 Th thorium 232.04	91 Pa protactinium 231.04	92 U uranium 238.03	93 Np neptunium (237)	94 Pu plutonium (244)	95 Am americium (243)	96 Cm curium (247)	97 Bk berkelium (247)	98 Cf californium (251)	99 Es einsteinium (252)	100 Fm fermium (257)	101 Md mendelevium (258)	102 No nobelium (259)	103 Lr lawrencium (260)

`\pgfPTresetstyle`**languages**default: `{}`Sets a language list to use in the Periodic Table. It is a comma separated list of language flags: 'pt', 'en', 'fr', 'de', 'it', 'es' or 'br'. *This key overrides the default language, that is, the language loaded at package inclusion.*`\pgfPT[Z list={1,...,54},languages=pt]`

Tabela Periódica dos Elementos

1																		2																	
1 H hidrogénio 1.008																		2 He hélio 4.0026																	
2 Li lítio 6.94																		3 Be berílio 9.0122																	
11 Na sódio 22.99																		12 Mg magnésio 24.305																	
19 K potássio 39.098																		20 Ca cálcio 40.078																	
21 Sc escândio 44.956																		22 Ti títânio 47.867																	
23 V vanádio 50.942																		24 Cr cromio 51.996																	
25 Mn manganésio 54.938																		26 Fe ferro 55.845																	
27 Co cobalto 58.933																		28 Ni níquel 58.693																	
29 Cu cobre 63.546																		30 Zn zinco 65.38																	
31 Ga gálio 69.723																		32 Ge germânio 72.63																	
33 As arsénio 74.922																		34 Se selénio 78.971																	
35 Br bromo 79.904																		36 Kr criptão 83.798																	
37 Rb rubídio 85.468																		38 Sr estrôncio 87.62																	
39 Y itrio 88.906																		40 Zr zircônio 91.224																	
41 Nb nióbio 92.906																		42 Mo molibdénio 95.95																	
43 Tc tecnécio 98																		44 Ru rútenio 101.07																	
45 Rh ródio 102.91																		46 Pd paládio 106.42																	
47 Ag prata 107.87																		48 Cd cádmio 112.41																	
49 In índio 114.82																		50 Sn estanho 118.71																	
51 Sb antimônio 121.76																		52 Te telúrio 127.6																	
53 I iodo 126.9																		54 Xe xénon 131.29																	

SQ

Al

Si

P

S

Cl

Br

I

Na

K

Rb

Cs

Fr

2. Número Atómico

3. Radioativo

4. Isótopo Comum

5. Nome

6. Massa Atômica Relativa

`\pgfPT[Z list={1,...,54},cell style=pgfPT2lang,languages={en,fr}]`

Periodic Table of Elements

Tableau Périodique des Éléments

Tableau Périodique des Éléments

1																	18		
1	H hydrogen 1.008																	2	He helium 4.0026
2	Li lithium 6.94	Be beryllium 9.0122															10	Ne neon 20.18	
3	Na sodium 22.99	Mg magnesium 24.305															18	Ar argon 39.95	
4	K potassium 39.098	Ca calcium 40.078	Sc scandium 44.956	Ti titanium 47.867	V vanadium 50.942	Cr chromium 51.996	Mn manganese 54.938	Fe iron 55.845	Co cobalt 58.933	Ni nickel 58.693	Cu copper 63.546	Zn zinc 65.38	Ga gallium 69.723	Ge germanium 72.63	As arsenic 74.922	Se selenium 78.971	Br bromine 79.904	Kr krypton 83.798	
5	Rb rubidium 85.468	Sr strontium 87.62	Y yttrium 88.906	Zr zirconium 91.224	Nb niobium 92.906	Mo molybdenum 95.95	Tc technetium 98	Ru ruthenium 101.07	Rh rhodium 102.91	Pd palladium 106.42	Ag silver 107.87	Cd cadmium 112.41	In indium 114.82	Sn tin 118.71	Sb antimony 121.76	Te tellurium 127.6	I iodine 126.9	Xe xenon 131.29	

CS

Ra

Ac

Th

Pa

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\pgfPT[Z list={1,...,54},cell style=pgfPT3lang,languages={pt,fr,it}]

Tabela Periódica dos Elementos
Tableau Périodique des Éléments
Tavola Periodica degli Elementi

When using a set of languages, space to accommodate the names in each cell must be provided by building a suitable cell - typically one cell row per language. The cell styles used in the two examples above are built-in and serve this purpose.

✓ Built-in style **pgfPT2lang**

The build command:

```
\pgfPTbuildcell(6,3)%
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4-5;1-3;name),(6;1-3;Ar)]
```

	1	2	3
1	Z		radio
2			
3		CS	
4			
5		name	
6		Ar	

scale 2:1

✓ Built-in style **pgfPT3lang**

The build command:

```
\pgfPTbuildcell(7,3)%
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4-6;1-3;name),(7;1-3;Ar)]
```

	1	2	3
1	Z		radio
2			
3			
4		CS	
5			
6		name	
7		Ar	

scale 2:1

Also, the space for the title should be taken into account – if using more than three languages, the legend must be *turned off*, otherwise the title overlaps the legend.

other languages font

default: \tiny

Sets the font used in *other languages*, i.e., the languages started at the second entry of the list provide to the **languages** key.

```
\pgfPT[Z list={1,...,36},cell style=pgfPT3lang,languages={en,es,br}, other languages
font=\tiny\bfseries]
```

Periodic Table of Elements
Tabla Periódica de los Elementos
Tabela Periódica dos Elementos

other languages colordefault: *black!70*Sets the color of the font used in *other languages*.

```
\pgfPT[Z list={1,...,36},cell style=pgfPT3lang,languages={en,pt,br}, other languages
color=purple]
```

Periodic Table of Elements
Tabela Periódica dos Elementos
Tabela Periódica dos Elementos

other langdefault: $\{f=\tiny,c=black!70\}$ *Pseudo style* to set the keys: other languages font and/or other languages color. None of the keys – f and c – are mandatory.

USAGE: other lang= $\{f=<\text{font commands}>,c=<\text{color}>\}$

```
\pgfPT[Z list={1,...,36},cell style=pgfPT3lang,languages={en,fr,de}, other
lang={f=\tiny\itshape,c=blue}]
```

Periodic Table of Elements
Tableau Périodique des Éléments
Periodensystem der Elemente

show MNM linedefault: *true*If set to *true* a line separating metals from non metals is shown in the Periodic Table. The line starts at the upper left corner of the cell of boron (2nd period, group 13) and ends at the lower right corner of polonium (6th period, group 16). If set to *false* no line is drawn.

`\pgfPT[Z list=spd]`

Periodic Table of Elements

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Periodic Table of Elements

Periods Table of Elements																			
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1	H hydrogen 1.008																	2	He helium 4.0026
2	Li lithium 6.94	Be beryllium 9.0122															10	Ne neon 20.18	
3	Na sodium 22.99	Mg magnesium 24.305															18	Ar argon 39.95	
4	K potassium 39.098	Ca calcium 40.078	Sc scandium 44.956	Ti titanium 47.867	V vanadium 50.942	Cr chromium 51.996	Mn manganese 54.938	Fe iron 55.845	Co cobalt 58.933	Ni nickel 58.693	Cu copper 63.546	Zn zinc 65.38	Ga gallium 69.723	Ge germanium 72.63	As arsenic 74.922	Se selenium 78.971	Br bromine 79.904	Kr krypton 83.798	
5	Rb rubidium 85.468	Sr strontium 87.62	Y yttrium 88.906	Zr zirconium 91.224	Nb niobium 92.906	Mo molybdenum 95.95	Tc technetium [98]	Ru ruthenium 101.07	Rh rhodium 102.91	Pd palladium 106.42	Ag silver 107.87	Cd cadmium 112.41	In indium 114.82	Sn tin 118.71	Sb antimony 121.76	Te tellurium 127.6	I iodine 126.9	Xe xenon 131.29	
6	Cs caesium 132.91	Ba barium 137.33	lanthanoids		Hf hafnium 178.49	Ta tantalum 180.95	W tungsten 183.84	Re rhenium 186.21	Os osmium 190.23	Ir iridium 192.22	Pt platinum 195.08	Au gold 196.97	Hg mercury 200.59	Tl thallium 204.38	Pb lead 207.2	Bi bismuth 208.98	Po polonium [209]	At astatine [210]	Rn radon [222]
7	Fr francium [223]	Ra radium [226]	actinoids		Rf rutherfordium [261]	Db dubnium [268]	Sg seaborgium [269]	Bh bohrium [270]	Hs hassium [270]	Mt meitnerium [278]	Ds darmstadtium [281]	Rg roentgenium [282]	Cn copernicium [285]	Nh nihonium [286]	Fl flerovium [289]	Mc moscovium [290]	Lv livermorium [293]	Ts tennessine [294]	Og oganesson [294]

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28.085

15

P

phosphorus

30.974

16

S

sulfur

32.06

17

Cl

chlorine

35.45

18

Ar

argon

39.95

19

K

potassium

39.098

20

Ca

calcium

40.078

21

Sc

scandium

44.956

22

Ti

titanium

47.867

23

V

vanadium

50.942

24

Cr

chromium

51.996

25

Mn

manganese

54.938

26

Fe

iron

55.845

27

Co

cobalt

58.933

28

Ni

nickel

58.693

29

Cu

copper

63.546

30

Zn

zinc

65.38

31

Ga

gallium

69.723

32

Ge

germanium

72.63

33

As

arsenic

74.922

34

Se

selenium

78.971

35

Br

bromine

79.904

36

Kr

krypton

83.798

37

Rb

rubidium

85.468

38

Sr

strontium

87.62

39

Y

yttrium

88.906

40

Zr

zirconium

91.224

41

Nb

niobium

92.906

42

Mo

molybdenum

95.95

43

Tc

technetium

[98]

44

Ru

ruthenium

101.07

45

Rh

rhodium

102.91

46

Pd

palladium

106.42

47

Ag

silver

107.87

48

Cd

cadmium

112.41

49

In

indium

114.82

50

Sn

tin

118.71

51

Sb

antimony

121.76

52

Te

tellurium

127.6

53

I

iodine

126.9

54

Xe

xenon

131.29

55

Cs

caesium

132.91

56

Ba

barium

137.33

57-71

lanthanoids

72

Hf

hafnium

178.49

73

Ta

tantalum

180.95

74

W

tungsten

183.84

75

Re

rhenium

186.21

76

Os

osmium

190.23

77

Ir

iridium

192.22

78

Pt

platinum

195.08

79

Au

gold

196.97

80

Hg

mercury

200.59

81

Tl

thallium

204.38

82

Pb

lead

207.2

83

Bi

bismuth

208.98

84

Po

polonium

[209]

85

At

astatine

[210]

86

Rn

radon

[222]

87

Fr

francium

[223]

88

Ra

radium

[226]

89-103

actinoids

104

Rf

rutherfordium

[261]

105

Db

dubnium

[268]

106

Sg

seaborgium

[269]

107

Bh

bohrium

[270]

108

Hs

hassium

[270]

109

Mt

meitnerium

[278]

110

Ds

darmstadtium

[281]

111

Rg

roentgenium

[282]

112

Cn

copernicium

[285]

113

Nh

nihonium

[286]

114

Fl

flerovium

[289]

115

Mc

moscovium

[290]

116

Lv

livermorium

[293]

117

Ts

tennessine

[294]

118

Og

oganesson

[294]

57	La	58	Ce	59	Pr	60	Nd	61	Pm	62	Sm	63	Eu	64	Gd	65	Tb	66	Dy	67	Ho	68	Er	69	Tm	70	Yb	71	Lu
	lanthanum		cerium		praseodymium		neodymium		promethium		samarium		euroium		gadolinium		terbium		dysprosium		holmium		erbium		thulium		ytterbium		lutetium
	138.91		140.91		140.91		144.24		[145]		150.36		151.96		157.25		158.93		162.50		164.93		167.26		168.93		173.05		174.96
89	Ac	90	Th	91	Pa	92	U	93	Np	94	Pu	95	Am	96	Cm	97	Bk	98	Cf	99	Es	100	Fm	101	Md	102	No	103	Lr
	actinium		thorium		protactinium		uranium		neptunium		plutonium		americium		curium		berkelium		californium		einsteinium		fermium		mendelevium		nobelium		lawrencium
	[227]		232.04		238.03		238.03		[237]		[242]		[243]		[247]		[247]		[251]		[252]		[257]		[258]		[259]		[261]

`\pgfPT[Z list={1,...,36}]`

Periodic Table of Elements

Callout Box for Cesium (Cs):

- Z: Atomic Number
- Ra: Radioactive
- CS: Chemical Symbol
- N: Name
- Ar: Relative Atomic Mass

MNM line colordefault: *red!80!black*Sets the color of the *MNM* line.

\pgfPT[MNM line color=green]

Periodic Table of Elements

Periodic Table of Elements

Legend:

- Z: Atomic Number
- Ra: Radioactive
- CS: Chemical Symbol
- N: Name
- Ar: Relative Atomic Mass

MNM line widthdefault: *.8pt*Sets the width of the *MNM* line.

\pgfPT[MNM line width=1.5pt]

Periodic Table of Elements

Periodic Table of Elements

Legend:

- Z: Atomic Number
- Ra: Radioactive
- CS: Chemical Symbol
- N: Name
- Ar: Relative Atomic Mass

MNMdefault: $\{c=\text{red!80!black},w=.8\text{pt}\}$

Pseudo style to set the *MNM line* color and/or width. None of the keys – c and w – are mandatory. The key **show MNM line** is set to **true**.

USAGE: $\text{MNM}=\{c=<\text{color}>,w=<\text{length}>\}$
 $\backslash\text{pgfPT}[\text{MNM}=\{w=1.5\text{pt},c=\text{red}\}]$

Periodic Table of Elements

Periodic Table of Elements																			
1																	18		
1	H																	2	
	hydrogen																	helium	
	1.008																	4.0026	
2	Li	Be															10		
	lithium	beryllium															neon		
	6.94	9.0122															20.18		
3	Na	Mg															18		
	sodium	magnesium															argon		
	22.99	24.305															39.95		
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr	
	potassium	calcium	scandium	titanium	vanadium	chromium	manganese	iron	cobalt	nickel	copper	zinc	gallium	germanium	arsenic	selenium	bromine	krypton	
	39.098	40.078	44.956	47.867	50.942	51.996	54.938	55.845	58.933	58.693	63.546	65.38	69.723	72.63	74.922	78.971	79.904	83.798	
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	
	rubidium	strontium	yttrium	zirconium	niobium	molybdenum	technetium	ruthenium	rhodium	palladium	silver	cadmium	indium	tin	antimony	tellurium	iodine	xenon	
	85.468	87.62	88.906	91.224	92.906	95.95	98.906	101.07	102.91	106.42	107.87	112.41	114.82	118.71	121.76	127.6	126.9	131.29	
6	Cs	Ba	Lanthanoids		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
	caesium	barium			hafnium	tantalum	tungsten	rhenium	osmium	iridium	platinum	gold	mercury	thallium	lead	bismuth	polonium	astatine	radon
	132.91	137.33			178.49	180.95	183.84	186.21	190.23	192.22	195.08	196.97	200.59	204.38	207.2	208.98	[209]	[210]	[222]
7	Fr	Ra	Actinoids		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og
	francium	radium			rutherfordium	dubnium	seaborgium	bohrium	hassium	meitnerium	darmstadtium	roentgenium	copernicium	nihonium	tennessium	moscovium	livermorium	tennessium	oganeson
	[223]	[226]			[261]	[268]	[269]	[270]	[270]	[278]	[281]	[282]	[285]	[286]	[289]	[290]	[293]	[294]	[294]
6	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu				
	lanthanum	cerium	praseodymium	neodymium	promethium	samarium	europium	gadolinium	terbium	dysprosium	holmium	erbium	thulium	ytterbium	lutetium				
	138.91	140.12	140.91	144.24	[145]	150.36	151.96	157.25	158.93	162.5	164.93	167.26	168.93	173.05	174.97				
7	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr				
	actinium	thorium	protactinium	uranium	neptunium	plutonium	americium	curium	berkelium	californium	einsteinium	fermium	mendeleevium	nobelium	lawrencium				
	[227]	232.04	231.04	238.03	[237]	[244]	[243]	[247]	[247]	[251]	[252]	[257]	[258]	[259]	[260]				

Title and Legend

show titledefault: *true*

When set to **true** the title is shown, otherwise the title (Periodic Table of elements) is not shown.

 $\backslash\text{pgfPT}[Z\text{ list}=\{1,...,36\}]$

Periodic Table of Elements

1																	18	
1	H																	2
	hydrogen																	helium
	1.008																	4.0026
2	Li	Be															10	
	lithium	beryllium															neon	
	6.94	9.0122															20.18	
3	Na	Mg															18	
	sodium	magnesium															argon	
	22.99	24.305															39.95	
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	potassium	calcium	scandium	titanium	vanadium	chromium	manganese	iron	cobalt	nickel	copper	zinc	gallium	germanium	arsenic	selenium	bromine	krypton
	39.098	40.078	44.956	47.867	50.942	51.996	54.938	55.845	58.933	58.693	63.546	65.38	69.723	72.63	74.922	78.971	79.904	83.798

2

Ra

CS

N

Ar

Z: Atomic Number

Ra: Radioactive

CS: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

```
\pgfPT[Z list={1,...,36},show title=false]
```

title font

Sets the font used in the title.

default: `\Large\bfseries`

```
\pgfPT[Z list={1,...,36},title font=\Huge\itshape]
```

Periodic Table of Elements
title color

Sets the title color.

default: *black*

```
\pgfPT[Z list={1,...,36},title color=green!50!black]
```

Periodic Table of Elements

titledefault: `{f=\Large\bfseries,c=black}`

Pseudo style to set the keys: title **f**ont and/or title **c**olor. None of the keys – f and c – are mandatory. The key **show title** is set to **true**.

USAGE: `title={f=,c=<color>}`

```
\pgfPT[Z list={1,...,36},title={f=\Huge,c=teal}]
```

Periodic Table of Elements

1

H

hydrogen

1.008

2

3

Li

lithium

6.94

4

Be

beryllium

9.0122

5

6

7

8

9

10

11

Na

sodium

22.99

12

Mg

magnesium

24.305

13

B

boron

10.81

14

C

carbon

12.011

15

N

nitrogen

14.007

16

O

oxygen

15.999

17

F

fluorine

18.998

18

Ne

neon

20.18

19

K

potassium

39.098

20

Ca

calcium

40.078

21

Sc

scandium

44.956

22

Ti

titanium

47.867

23

V

vanadium

50.942

24

Cr

chromium

51.996

25

Mn

manganese

54.938

26

Fe

iron

55.845

27

Co

cobalt

58.933

28

Ni

nickel

58.693

29

Cu

copper

63.546

30

Zn

zinc

65.38

31

Ga

gallium

69.723

32

Ge

germanium

72.63

33

As

arsenic

74.922

34

Se

selenium

78.971

35

Br

bromine

79.904

36

Kr

krypton

83.798

2

Cs

cesium

radioactive

chemical symbol

name

relative atomic mass

Z: Atomic Number

Ra: Radioactive

CS: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

show legend

default: *true*When set to *true* the legend is shown, otherwise it is not shown.

```
\pgfPT[Z list={1,...,36}]
```

Periodic Table of Elements

1

H

hydrogen

1.008

2

3

Li

lithium

6.94

4

Be

beryllium

9.0122

5

6

7

8

9

10

11

Na

sodium

22.99

12

Mg

magnesium

24.305

13

14

15

16

17

18

He

helium

4.0026

2

CS

N

Ar

atomic

number

relative

atomic

mass

elemental

symbol

group

number

period

number

Z: Atomic Number

Ra: Radioactive

C: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

13

B

boron

10.81

14

C

carbon

12.011

15

N

nitrogen

14.007

16

O

oxygen

15.999

17

F

fluorine

18.998

18

Ne

neon

20.18

19

20

21

22

23

24

25

26

27

28

29

30

31

Al

aluminium

26.982

32

Si

silicon

28.085

33

P

phosphorus

30.974

34

S

sulfur

32.06

35

Cl

chlorine

35.45

36

Ar

argon

39.95

37

38

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65

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69

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72

73

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75

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77

78

79

80

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89

90

91

92

93

94

95

96

97

98

99

100

```
\pgfPT[Z list={1,...,36},show legend=false]
```

Periodic Table of Elements

1																	18																		
1	H																	2																	
	hydrogen																	helium																	
	1.008																	4.0026																	
3	Li	4	Be													10																			
	lithium		beryllium													neon																			
	6.94		9.0122													20.18																			
11	Na	12	Mg	13	B	14	C	15	N	16	O	17	F	18	Ar																				
	sodium		magnesium		boron		carbon		nitrogen		oxygen		fluorine		argon																				
	22.99		24.305		10.81		12.011		14.007		15.999		18.998		39.95																				
19	K	20	Ca	21	Sc	22	Ti	23	V	24	Cr	25	Mn	26	Fe	27	Co	28	Ni	29	Cu	30	Zn	31	Ga	32	Ge	33	As	34	Se	35	Br	36	Kr
	potassium		calcium		scandium		titanium		vanadium		chromium		manganese		iron		cobalt		nickel		copper		zinc		gallium		germanium		arsenic		selenium		bromine		krypton
	39.098		40.078		44.956		47.867		50.942		51.996		54.938		55.845		58.933		58.693		63.546		65.38		69.723		72.63		74.922		78.971		79.904		83.798

legend acronyms

default: *true*When set to *true*, the legend consists of a cell using acronyms for its contents and the corresponding descriptions below that cell. When set to *false*, only the cell is displayed with the descriptions in place of the acronyms. In the latter case, the description font size is automatically adjusted to the available box, which can *spoil the appearance of the whole caption*, depending on the described content.

1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18

Z

Atomic Number

☼

Radioactive

E

Element Symbol

solid
liquid
gas
plasma
synthetic

Name

Relative Atomic Mass

1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	2	3	4	5	6	7	8	9	10								

default: *true*

`\pgfPT[Z list={1,...,36}]`

The periodic table displays elements from Hydrogen (1) to Krypton (36). A callout box for Carbon (C) provides the following details:

- Z: Atomic Number** 6
- Ra: Radioactive**
- CS: Chemical Symbol**
- C: Name** Carbon
- Ar: Relative Atomic Mass** 12.011

```
\pgfPT[Z list={1,...,36},show legend pins=false]
```

1																	18			
1	1 H hydrogen 1.008																	2	He helium 4.0026	
2	3 Li lithium 6.94	4 Be beryllium 9.0122															10	Ne neon 20.18		
3	11 Na sodium 22.99	12 Mg magnesium 24.305	3	4	5	6	7	8	9	10	11	12	13	13 B boron 10.81	14 C carbon 12.011	15 N nitrogen 14.007	16 O oxygen 15.999	17 F fluorine 18.998	18	Ar argon 39.95
4	19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36	Kr krypton 83.798

```
default: {line width=.05pt,rounded corners=2pt,right color=black!5,  
left color=white,draw=black!50}
```

```
\pgfPT[Z list={1,...,36}]
```

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 H hydrogen 1.008		2 He helium 4.0026															
3 Li lithium 6.94	4 Be beryllium 9.0122																
5 Na sodium 22.99	6 Mg magnesium 24.305																
7 K potassium 39.098	8 Ca calcium 40.078	9 Sc scandium 44.956	10 Ti titanium 47.867	11 V vanadium 50.942	12 Cr chromium 51.996	13 Mn manganese 54.938	14 Fe iron 55.845	15 Co cobalt 58.933	16 Ni nickel 58.693	17 Cu copper 63.546	18 Zn zinc 65.38	19 Ga gallium 69.723	20 Ge germanium 72.63	21 As arsenic 74.922	22 Se selenium 78.971	23 Br bromine 79.904	24 Kr krypton 83.798

2

Ra

Cs

N

Ar

radioactive element

Z: Atomic Number
Ra: Radioactive
Cs: Chemical Symbol
N: Name
Ar: Relative Atomic Mass

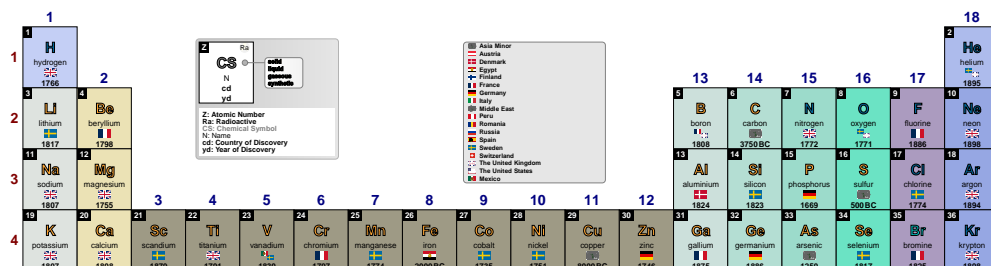
extra legend

default: $\{draw=black!50,fill=black!10,line\ width=.05pt,rounded\ corners=2pt\}$

Style to define the appearance of the extra legend, built with any of the TikZ keys that can be applied to a path construction.

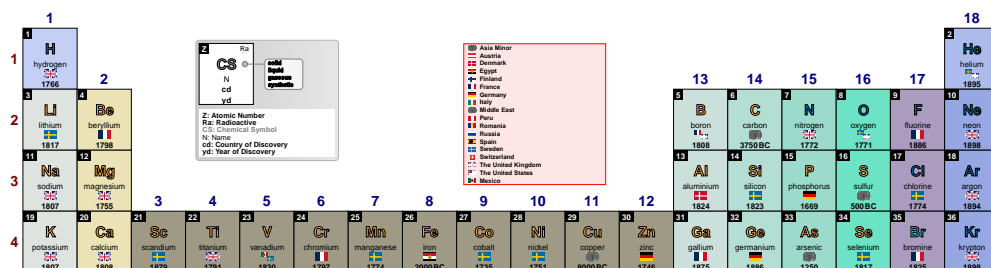
`\pgfPT[Z list={1,...,36},cell style=pgfPTdisc]`

Periodic Table of Elements



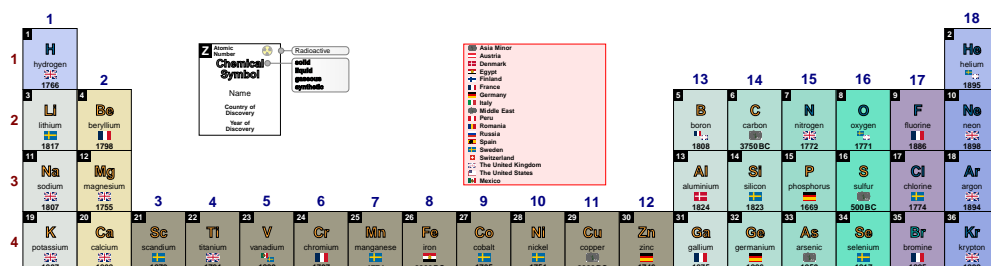
`\pgfPT[Z list={1,...,36},cell style=pgfPTdisc,extra legend={draw=red,fill=red!10}]`

Periodic Table of Elements



`\pgfPT[Z list={1,...,36},cell style=pgfPTdisc,legend acronyms=false,extra legend={draw=red,fill=red!10}]`

Periodic Table of Elements

**legend**

default: $\{bc=white,pins=true,extra=true,acro=true\}$

Pseudo style to set the keys: legend **back** color, show legend **pins**, show **extra** legend, legend **acronyms**, legend **radio** color, legend **CS** color, legend **Z** color, legend **pins** (style), **extra** legend (style) and/or legend **box** (style). None of the keys – bc, pins, extra, acro, radio, CS, Z, pins style, extra style and box – are mandatory. The key **show legend** is set to **true**.

USAGE:

legend= $\{bc=<color>,pins=<true|false>,extra=<true|false>,acro=<true|false>,radio=<color>,CS=<color>,Z=<color>,pins\ style=<tikz\ path\ keys>,extra\ style=<tikz\ path\ keys>,box=<tikz\ path\ keys>\}$

```
\pgfPT[Z list={1,...,36},cell style=myname,legend={bc=black!10,extra=false}]
```

Periodic Table of Elements

```
\pgfPT[Z list={1,...,36},cell style=myname,legend={acro=false,extra=false}]
```

Periodic Table of Elements

► Periods and Groups

show period numbers

default: *true*

When set to *true* the period numbers are shown, otherwise they are not shown.

```
\pgfPT[Z list={1,...,36}]
```

Periodic Table of Elements

```
\pgfPT[Z list={1,...,36},show period numbers=false]
```

Periodic Table of Elements

show group numbersdefault: *true*When set to *true* the group numbers are shown, otherwise they are not shown.`\pgfPT[Z list={1,...,36}]`**Periodic Table of Elements**

1

H

hydrogen

1.008

2

He

helium

4.0026

3

Li

lithium

6.94

4

Be

beryllium

9.0122

5

B

boron

10.81

6

C

carbon

12.011

7

N

nitrogen

14.007

8

O

oxygen

15.999

9

F

fluorine

18.998

10

Ne

neon

20.18

11

Na

sodium

22.99

12

Mg

magnesium

24.305

13

Al

aluminum

26.982

14

Si

silicon

28.085

15

P

phosphorus

30.974

16

S

sulfur

32.06

17

Cl

chlorine

35.45

18

Ar

argon

39.95

19

K

potassium

39.098

20

Ca

calcium

40.078

21

Sc

scandium

44.956

22

Ti

titanium

47.867

23

V

vanadium

50.942

24

Cr

chromium

51.996

25

Mn

manganese

54.938

26

Fe

iron

55.845

27

Co

cobalt

58.933

28

Ni

nickel

58.693

29

Cu

copper

63.546

30

Zn

zinc

65.38

31

Ga

gallium

69.723

32

Ge

germanium

72.63

33

As

arsenic

74.922

34

Se

selenium

78.971

35

Br

bromine

79.904

36

Kr

krypton

83.798

2

CS

Ra

radioactive

CS

chemical symbol

N

name

Ar

relative atomic mass

`\pgfPT[Z list={1,...,36},show group numbers=false]`**Periodic Table of Elements**

1

H

hydrogen

1.008

2

He

helium

4.0026

3

Li

lithium

6.94

4

Be

beryllium

9.0122

5

B

boron

10.81

6

C

carbon

12.011

7

N

nitrogen

14.007

8

O

oxygen

15.999

9

F

fluorine

18.998

10

Ne

neon

20.18

11

Na

sodium

22.99

12

Mg

magnesium

24.305

13

Al

aluminum

26.982

14

Si

silicon

28.085

15

P

phosphorus

30.974

16

S

sulfur

32.06

17

Cl

chlorine

35.45

18

Ar

argon

39.95

19

K

potassium

39.098

20

Ca

calcium

40.078

21

Sc

scandium

44.956

22

Ti

titanium

47.867

23

V

vanadium

50.942

24

Cr

chromium

51.996

25

Mn

manganese

54.938

26

Fe

iron

55.845

27

Co

cobalt

58.933

28

Ni

nickel

58.693

29

Cu

copper

63.546

30

Zn

zinc

65.38

31

Ga

gallium

69.723

32

Ge

germanium

72.63

33

As

arsenic

74.922

34

Se

selenium

78.971

35

Br

bromine

79.904

36

Kr

krypton

83.798

2

CS

N

Ar

radioactive

chemical symbol

name

relative atomic mass

Z: Atomic Number

Ra: Radioactive

CS: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

period label colordefault: *red!50!black*

Sets the period label color.

`\pgfPT[Z list={1,...,36},period label color=black]`**Periodic Table of Elements**

1

1

H

hydrogen

1.008

2

2

He

helium

4.0026

3

4

Li

lithium

6.94

Be

beryllium

9.0122

11

12

Na

sodium

22.99

Mg

magnesium

24.305

13

14

15

16

17

18

B

boron

10.81

C

carbon

12.011

N

nitrogen

14.007

O

oxygen

15.999

F

fluorine

18.998

Ne

neon

20.18

19

20

21

22

23

24

25

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27

28

29

30

K

potassium

39.098

Ca

calcium

40.078

Sc

scandium

44.956

Ti

titanium

47.867

V

vanadium

50.942

Cr

chromium

51.996

Mn

manganese

54.938

Fe

iron

55.845

Co

cobalt

58.933

Ni

nickel

58.693

Cu

copper

63.546

Zn

zinc

65.38

31

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36

Ga

gallium

69.723

Ge

germanium

72.63

As

arsenic

74.922

Se

selenium

78.971

Br

bromine

79.904

Kr

krypton

83.798

2

CS

N

Ar

Z: Atomic Number

Ra: Radioactive

CS: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

radio

liquid

gases

synthesis

group label colordefault: *blue!50!black*

Sets the group label color.

`\pgfPT[Z list={1,...,36},group label color=black]`

Periodic Table of Elements

1	2											13	14	15	16	17	18	
1	H															He		
	hydrogen															helium		
	1.008															4.0026		
2	3	4									5	6	7	8	9	10		
	Li		Be													Ne		
	lithium		beryllium													neon		
	6.94		9.0122													20.18		
3	11	12									13	14	15	16	17	18		
	Na		Mg													Ar		
	sodium		magnesium													argon		
	22.99		24.305													39.95		
4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	potassium	calcium	scandium	titanium	vanadium	chromium	manganese	iron	cobalt	nickel	copper	zinc	gallium	germanium	arsenic	selenium	bromine	krypton
	39.098	40.078	44.956	47.867	50.942	51.996	54.938	55.845	58.933	58.693	63.546	65.38	69.723	72.63	74.922	78.971	79.904	83.798

label font

Sets the label font.

default: `\small\bfseries`

`\pgfPT[Z list={1,...,36},label font=\itshape]`

Periodic Table of Elements

1	2											13	14	15	16	17	18	
1	H															He		
	hydrogen															helium		
	1.008															4.0026		
2	3	4									5	6	7	8	9	10		
	Li		Be													Ne		
	lithium		beryllium													neon		
	6.94		9.0122													20.18		
3	11	12									13	14	15	16	17	18		
	Na		Mg													Ar		
	sodium		magnesium													argon		
	22.99		24.305													39.95		
4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	potassium	calcium	scandium	titanium	vanadium	chromium	manganese	iron	cobalt	nickel	copper	zinc	gallium	germanium	arsenic	selenium	bromine	krypton
	39.098	40.078	44.956	47.867	50.942	51.996	54.938	55.845	58.933	58.693	63.546	65.38	69.723	72.63	74.922	78.971	79.904	83.798

per

default: `{gr=true,c=red!50!black,f=\small\bfseries}`

Pseudo style to set the keys: show **g**roup numbers, period label color and/or label font. None of the keys – gr, c and f – are mandatory. The key **show period numbers** is set to **true**.

USAGE: `per={gr=<true|false>,c=<color>,f=}`

`\pgfPT[Z list={1,...,36},per={gr=false,c=green!50!black}]`

Periodic Table of Elements

1

H

hydrogen

1.008

2

He

helium

4.0026

3

Li

lithium

6.94

4

Be

beryllium

9.0122

11

Na

sodium

22.99

12

Mg

magnesium

24.305

19

K

potassium

39.098

20

Ca

calcium

40.078

21

Sc

scandium

44.956

22

Ti

titanium

47.867

23

V

vanadium

50.942

24

Cr

chromium

51.996

25

Mn

manganese

54.938

26

Fe

iron

55.845

27

Co

cobalt

58.933

28

Ni

nickel

58.693

29

Cu

copper

63.546

30

Zn

zinc

65.38

31

Ga

gallium

69.723

32

Ge

germanium

72.63

33

As

arsenic

74.922

34

Se

selenium

78.971

35

Br

bromine

79.904

36

Kr

krypton

83.798

Z: Atomic Number

Ra: Radioactive

Cs: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

2

He

helium

4.0026

CS

Ar

radio

neutral

gasous

element

gr

default: `{per=true,c=blue!50!black,f=\small\bfseries}`

Pseudo style to set the keys: show **p**eriod numbers, group label color and/or label font. None of the keys – per, c and f – are mandatory. The key **show group numbers** is set to **true**.

USAGE: `gr={per=<true|false>,c=<color>,f=}`

```
\pgfPT[Z list={1,...,36},gr={per=false,c=green!50!black}]
```

Periodic Table of Elements

1 H hydrogen 1.008																	18 He helium 4.0026						
2 Li lithium 6.94	3 Be beryllium 9.0122																	13 B boron 10.81	14 C carbon 12.011	15 N nitrogen 14.007	16 O oxygen 15.999	17 F fluorine 18.998	18 Ne neon 20.18
11 Na sodium 22.99	12 Mg magnesium 24.305																	13 Al aluminum 26.982	14 Si silicon 28.085	15 P phosphorus 30.974	16 S sulfur 32.06	17 Cl chlorine 35.45	18 Ar argon 39.95
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798						

per+grdefault: $\{pc=red!50!black,gc=blue!50!black,f=\small\bfseries\}$

Pseudo style: use **c** to set both keys group label color and period label color with the same color; use **pc** to set period label color, **gc** to set group label color and/or **f** to set label font. None of the keys – c, pc, gc and f – are mandatory. The keys **show period numbers** and **show group numbers** are set to **true**.

USAGE: `per+gr={c=<color>,pc=<color>,gc=<color>,f=}`

```
\pgfPT[Z list={1,...,36},per+gr={c=green!50!black,
f=\fontfamily{frc}\selectfont\normalsize\bfseries}]
```

Periodic Table of Elements

1

2

3

4

5

6

7

8

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10

11

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13

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18

1 H hydrogen 1.008																	18 He helium 4.0026						
2 Li lithium 6.94	3 Be beryllium 9.0122																	13 B boron 10.81	14 C carbon 12.011	15 N nitrogen 14.007	16 O oxygen 15.999	17 F fluorine 18.998	18 Ne neon 20.18
11 Na sodium 22.99	12 Mg magnesium 24.305																	13 Al aluminium 26.982	14 Si silicon 28.085	15 P phosphorus 30.974	16 S sulfur 32.06	17 Cl chlorine 35.45	18 Ar argon 39.95
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798						

2

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1000

Z: Atomic Number

Ra: Radioactive

C.S.: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

► Blocks and Families

show blocksdefault: *false*

When set to **true** the blocks **s**, **p**, **d** and **f** are drawn overlaying the Periodic Table and their labels are shown. Note that blocks are only shown when the **Z list** contains, at least, all elements of blocks **s**, **p** and **d**.

```
\pgfPT[Z list={1,...,36},show blocks=true,show title=false]
```

1

18

1 H hydrogen 1.008																	18 He helium 4.0026						
2 Li lithium 6.94	3 Be beryllium 9.0122																	13 B boron 10.81	14 C carbon 12.011	15 N nitrogen 14.007	16 O oxygen 15.999	17 F fluorine 18.998	18 Ne neon 20.18
11 Na sodium 22.99	12 Mg magnesium 24.305																	13 Al aluminum 26.982	14 Si silicon 28.085	15 P phosphorus 30.974	16 S sulfur 32.06	17 Cl chlorine 35.45	18 Ar argon 39.95
19 K potassium	20 Ca calcium	21 Sc scandium	22 Ti titanium	23 V vanadium	24 Cr chromium	25 Mn manganese	26 Fe iron	27 Co cobalt	28 Ni nickel	29 Cu copper	30 Zn zinc	31 Ga gallium	32 Ge germanium	33 As arsenic	34 Se selenium	35 Br bromine	36 Kr krypton						

2

CS

Ra

radio

active

element

symbol

Z: Atomic Number

Ra: Radioactive

C.S.: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

\pgfPT[show blocks,show title=false]

Periodic table showing element symbols, atomic numbers, and names. The table is color-coded by blocks: s-block (yellow), p-block (green), d-block (red), and f-block (blue). The legend box indicates the format for element information: Z: Atomic Number, Ra: Radioactive, CS: Chemical Symbol, N: Name, Ar: Relative Atomic Mass.

\pgfPT[Z list=spd,show blocks,show title=false]

Periodic table showing element symbols, atomic numbers, and names. The table is color-coded by blocks: s-block (yellow), p-block (green), d-block (red), and f-block (blue). The legend box indicates the format for element information: Z: Atomic Number, Ra: Radioactive, CS: Chemical Symbol, N: Name, Ar: Relative Atomic Mass.

\pgfPT[Z list=spd,show blocks,show title=false,IUPAC=false]

Periodic table showing element symbols, atomic numbers, and names. The table is color-coded by blocks: s-block (yellow), p-block (green), d-block (red), and f-block (blue). The legend box indicates the format for element information: Z: Atomic Number, Ra: Radioactive, CS: Chemical Symbol, N: Name, Ar: Relative Atomic Mass.

blocks fontdefault: `\small\bfseries`

Sets the font used in the block labels.

```
\pgfPT[Z list=spd,show blocks,show title=false,blocks
font=\small\bfseries\fontfamily{ptm}\selectfont]
```

The diagram shows a standard periodic table with the following blocks highlighted:

- s-block (yellow):** Groups 1 and 2, plus Helium (He) at the end of the noble gases.
- p-block (green):** Groups 13 through 18.
- d-block (pink):** Groups 3 through 10.
- f-block (light blue):** The lanthanide and actinide series, shown below the main table.

A legend box in the center contains the following information:

- Z:** Atomic Number
- Ra:** Radioactive
- CS:** Chemical Symbol
- N:** Name
- Ar:** Relative Atomic Mass

s block colordefault:  RGB: 255,231,132

Sets the block s color.

s block font colordefault: `{}`Sets the s block label font color. If no color is provided, the **s block color** will be used as the font color.**s block line width**default: `0.8pt`

Sets the width of the line surrounding the s block.

p block colordefault:  RGB: 170,255,172

Sets the block p color.

p block font colordefault: `{}`Sets the p block label font color. If no color is provided, the **p block color** will be used as the font color.**p block line width**default: `0.8pt`

Sets the width of the line surrounding the p block.

d block colordefault:  RGB: 255,187,187

Sets the block d color.

d block font colordefault: `{}`Sets the d block label font color. If no color is provided, the **d block color** will be used as the font color.**d block line width**default: `0.8pt`

Sets the width of the line surrounding the d block.

f block colordefault:  RGB: 177,203,228

Sets the block f color.

f block font colordefault: `{}`Sets the f block label font color. If no color is provided, the **f block color** will be used as the font color.

f block line widthdefault: *0.8pt*

Sets the width of the line surrounding the f block.

blocks font colordefault: *black*Style to set a common color for the labels of s, p, d and f blocks. The key `show blocks` is set to `true`.

\pgfPT[blocks font color,show title=false]

Periodic Table of Elements showing blocks highlighted in yellow (s-block), green (p-block), red (d-block), and blue (f-block). The table includes element symbols, names, atomic numbers, and relative atomic masses. A legend box shows the block colors and their corresponding labels: s-block (yellow), p-block (green), d-block (red), and f-block (blue).

blocks line widthdefault: *0.8pt*Style to set a common width of the lines surrounding the s, p, d and f blocks. The key `show blocks` is set to `true`.

\pgfPT[blocks line width=1.5pt]

Periodic Table of Elements

Periodic Table of Elements showing blocks highlighted in yellow (s-block), green (p-block), red (d-block), and blue (f-block). The table includes element symbols, names, atomic numbers, and relative atomic masses. A legend box shows the block colors and their corresponding labels: s-block (yellow), p-block (green), d-block (red), and f-block (blue).

\pgfPT[show families,show title=false,IUPAC=false]

Periodic table showing families and representative elements. The table is color-coded by groups. A callout box for 'REPRESENTATIVE ELEMENTS' points to groups 1, 2, 13, 14, 15, 16, and 17. Another callout box for 'INTERNAL TRANSITION METALS' points to the lanthanoid and actinoid series.

families font

Sets the font used in the family labels.

default: `\small\bfseries`

\pgfPT[show families,show title=false,families font=\normalsize]

Periodic table showing families and representative elements with normal font. The table is color-coded by groups. A callout box for 'REPRESENTATIVE ELEMENTS' points to groups 1, 2, 13, 14, 15, 16, and 17. Another callout box for 'INTERNAL TRANSITION METALS' points to the lanthanoid and actinoid series.

r family color

Sets the representative elements *block* color.

default: RGB: 170,255,172

r family font color

Sets the representative elements *block* label font color. If no color is provided, the **r family color** will be used as the font color.

default: `{}`

r family line width

default: 0.8pt

Sets the width of the line surrounding the representative elements *block*.**tm family color**default:  RGB: 255,187,187Sets the transition metals *block* color.**tm family font color**

default: {}

Sets the transition metals *block* label font color. If no color is provided, the **tm family color** will be used as the font color.**tm family line width**

default: 0.8pt

Sets the width of the line surrounding the transition metals *block*.**itm family color**default:  RGB: 177,203,228Sets the internal transition metals *block* color.**itm family font color**

default: {}

Sets the internal transition metals *block* label font color. If no color is provided, the **itm family color** will be used as the font color.**itm family line width**

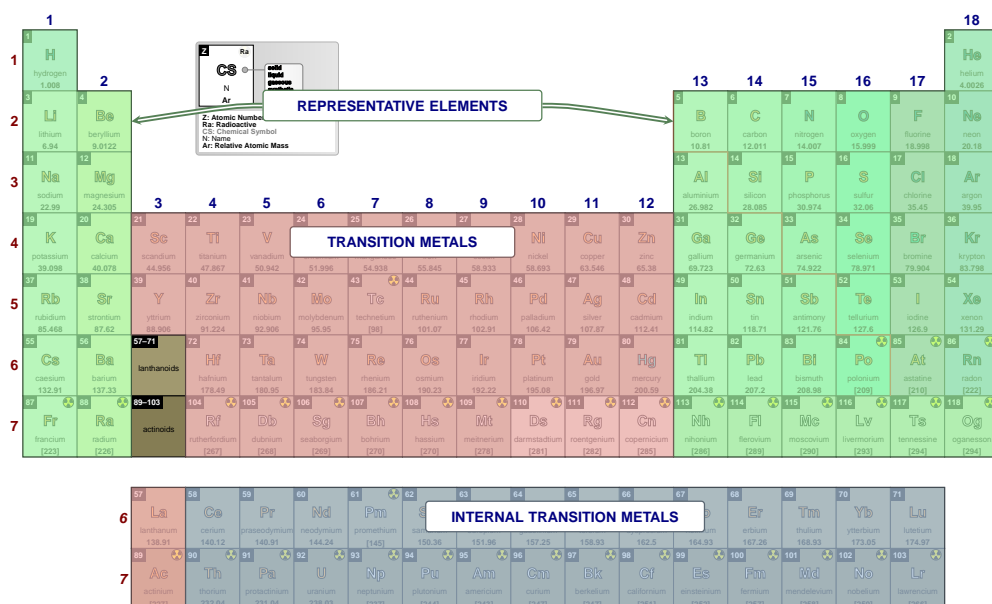
default: 0.8pt

Sets the width of the line surrounding the internal transition metals *block*.**families font color**

default: black

Style to set a common color for the labels of representative elements, transition metals and internal transition metals *blocks*. The key **show blocks** is set to **true**.

\pgfPT[show title=false,families font color=blue!50!black]



The periodic table displays elements grouped into three main categories based on color and labeling:

- Representative Elements (Green):** Located on the far left (Groups 1-2) and far right (Groups 13-18). Includes elements like Hydrogen (H), Helium (He), Lithium (Li), Beryllium (Be), Sodium (Na), Magnesium (Mg), Aluminum (Al), Silicon (Si), Phosphorus (P), Sulfur (S), Chlorine (Cl), Argon (Ar), Potassium (K), Calcium (Ca), Scandium (Sc), Titanium (Ti), Vanadium (V), Chromium (Cr), Manganese (Mn), Iron (Fe), Cobalt (Co), Nickel (Ni), Copper (Cu), Zinc (Zn), Gallium (Ga), Germanium (Ge), Arsenic (As), Selenium (Se), Bromine (Br), Krypton (Kr), Rubidium (Rb), Strontium (Sr), Yttrium (Y), Zirconium (Zr), Niobium (Nb), Molybdenum (Mo), Technetium (Tc), Ruthenium (Ru), Rhodium (Rh), Palladium (Pd), Silver (Ag), Cadmium (Cd), Indium (In), Tin (Sn), Antimony (Sb), Tellurium (Te), Iodine (I), Xenon (Xe), Cesium (Cs), Barium (Ba), Lanthanoids, Hafnium (Hf), Tantalum (Ta), Tungsten (W), Rhenium (Re), Osmium (Os), Iridium (Ir), Platinum (Pt), Gold (Au), Mercury (Hg), Thallium (Tl), Lead (Pb), Bismuth (Bi), Polonium (Po), Astatine (At), Radon (Rn), Francium (Fr), Radium (Ra), Actinoids, Actinium (Ac), Thorium (Th), Protactinium (Pa), Uranium (U), Neptunium (Np), Plutonium (Pu), Americium (Am), Curium (Cm), Berkelium (Bk), Californium (Cf), Einsteinium (Es), Fermium (Fm), Mendelevium (Md), Nobelium (No), Lawrencium (Lr), Rutherfordium (Rf), Dubnium (Db), Seaborgium (Sg), Bohrium (Bh), Hassium (Hs), Meitnerium (Mt), Darmstadtium (Ds), Roentgenium (Rg), Copernicium (Cn), Nihonium (Nh), Tennessine (Ts), and Oganesson (Og).
- Transition Metals (Pink):** Located in the center of the table, between Groups 3 and 10. Includes elements like Scandium (Sc), Titanium (Ti), Vanadium (V), Chromium (Cr), Manganese (Mn), Iron (Fe), Cobalt (Co), Nickel (Ni), Copper (Cu), Zinc (Zn), Gallium (Ga), Germanium (Ge), Arsenic (As), Selenium (Se), Bromine (Br), Krypton (Kr), Rubidium (Rb), Strontium (Sr), Yttrium (Y), Zirconium (Zr), Niobium (Nb), Molybdenum (Mo), Technetium (Tc), Ruthenium (Ru), Rhodium (Rh), Palladium (Pd), Silver (Ag), Cadmium (Cd), Indium (In), Tin (Sn), Antimony (Sb), Tellurium (Te), Iodine (I), Xenon (Xe), Cesium (Cs), Barium (Ba), Lanthanoids, Hafnium (Hf), Tantalum (Ta), Tungsten (W), Rhenium (Re), Osmium (Os), Iridium (Ir), Platinum (Pt), Gold (Au), Mercury (Hg), Thallium (Tl), Lead (Pb), Bismuth (Bi), Polonium (Po), Astatine (At), Radon (Rn), Francium (Fr), Radium (Ra), Actinoids, Actinium (Ac), Thorium (Th), Protactinium (Pa), Uranium (U), Neptunium (Np), Plutonium (Pu), Americium (Am), Curium (Cm), Berkelium (Bk), Californium (Cf), Einsteinium (Es), Fermium (Fm), Mendelevium (Md), Nobelium (No), Lawrencium (Lr), Rutherfordium (Rf), Dubnium (Db), Seaborgium (Sg), Bohrium (Bh), Hassium (Hs), Meitnerium (Mt), Darmstadtium (Ds), Roentgenium (Rg), Copernicium (Cn), Nihonium (Nh), Tennessine (Ts), and Oganesson (Og).
- Internal Transition Metals (Blue):** Located at the bottom of the table, below the main body. Includes elements like Lanthanoids (La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu) and Actinoids (Ac, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr).

families line width

default: 0.8pt

Style to set a common width of the lines surrounding the representative elements, transition metals and internal transition metals *blocks*. The key **show families** is set to **true**.

\pgfPT[show title=false,show families,families line width=1.5pt]

familiesdefault: $\{rc=blocor,tc=blocot,ic=blocoi,lw=.8pt,f=\small\backslash bfseries\}$

Pseudo style to set the keys: **r** family color, **tm** family color, **itm** family color, the common line width of the families, the **r** family line width, the **tm** family line width, the **itm** family line width, the families font, **r** family font color, **tm** family font color and/or **itm** family font color. None of the keys – rc, tc, ic, lw, rlw, ilw, f, rfc, tfc and ifc – are mandatory. The key **show families** is set to **true**.

NOTE:

The colors provided to the color keys of the families could be any defined color via the command `\definecolor` or by *mixing* colors, using, for instance, the syntax `color1!value!color2`, as explained in the `xcolor` package documentation.

USAGE:

families={rc=<color>,tc=<color>,ic=<color>,lw=<lenght>,rlw=<lenght>,
tlw=<lenght>,ilw=<lenght>,f=,rfc=<color>,
tfc=<color>,ifc=<color>}

`\pgfPT[families={rc=red!70!white,ic=yellow!70!white,lw=2pt},show title=false]`

\pgfPT[families={rc=blue,ic=yellow!70!white,rlw=2pt},show title=false]

REPRESENTATIVE ELEMENTS

2: Atomic Number
Cs: Radioactive
N: Name
Ar: Relative Atomic Mass

TRANSITION METALS

INTERNAL TRANSITION METALS

\pgfPT[families={rc=blue,ic=yellow!70!white,rlw=2pt,ifc=yellow!70!black},show title=false]

REPRESENTATIVE ELEMENTS

2: Atomic Number
Cs: Radioactive
N: Name
Ar: Relative Atomic Mass

TRANSITION METALS

INTERNAL TRANSITION METALS

► Periodic variations

show periodic variations

default: *false*

When set to *true* the periodic variations – for atomic radius, ionization energy and/or electron affinity – are shown with two *arrows*. One horizontal arrow is placed at the top of the Periodic Table for the variation over the period and the other vertically to the left of the Periodic Table for the variation over the group.

NOTE:

The variations are only shown when the *base cell* of the Periodic Table contains the atomic radius, the ionization energy and/or the electron affinity. If none of them is present setting this key (*show periodic variations*) has no effect.

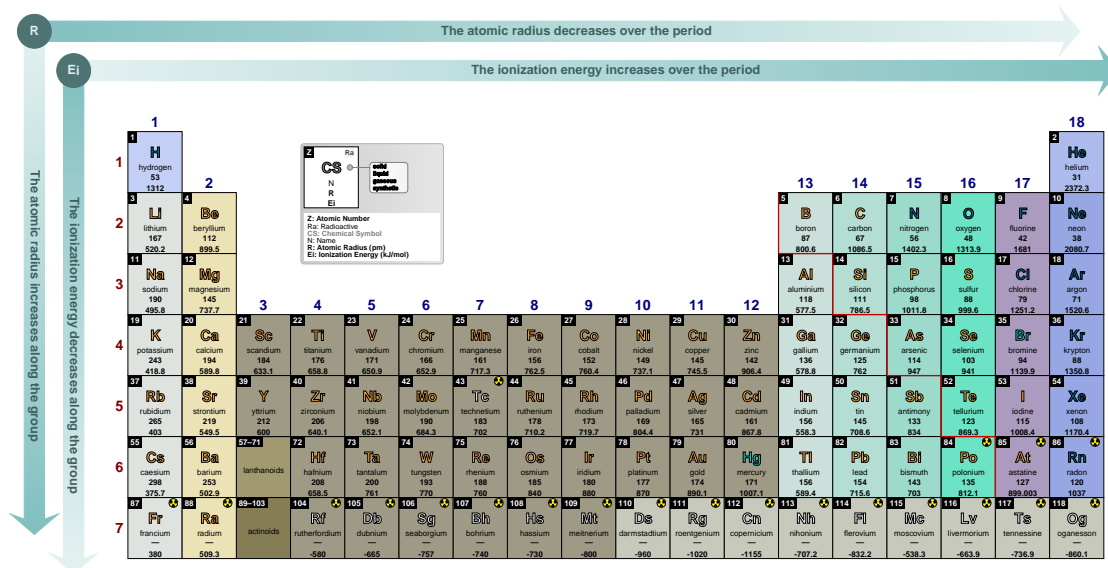
```
\pgfPTstyle[Z list=spd,show title=false]
\pgfPT[show periodic variations]
```

1																	18																																			
1	<div>H</div> hydrogen 1.008																	2	<div>He</div> helium 4.0026																																	
2	<div>Li</div> lithium 6.94	<div>Be</div> beryllium 9.0122															13	<div>B</div> boron 10.81	14	<div>C</div> carbon 12.011	15	<div>N</div> nitrogen 14.007	16	<div>O</div> oxygen 15.999	17	<div>F</div> fluorine 18.998	18	<div>Ne</div> neon 20.18																								
3	<div>Na</div> sodium 22.99	<div>Mg</div> magnesium 24.305															19	<div>K</div> potassium 39.098	20	<div>Ca</div> calcium 40.078	21	<div>Sc</div> scandium 44.956	22	<div>Ti</div> titanium 47.867	23	<div>V</div> vanadium 50.942	24	<div>Cr</div> chromium 51.996	25	<div>Mn</div> manganese 54.938	26	<div>Fe</div> iron 55.845	27	<div>Co</div> cobalt 58.933	28	<div>Ni</div> nickel 58.693	29	<div>Cu</div> copper 63.546	30	<div>Zn</div> zinc 65.38	31	<div>Ga</div> gallium 69.723	32	<div>Ge</div> germanium 72.63	33	<div>As</div> arsenic 74.922	34	<div>Se</div> selenium 78.971	35	<div>Br</div> bromine 79.904	36	<div>Kr</div> krypton 83.798
4	<div>Rb</div> rubidium 85.468	<div>Sr</div> strontium 87.62	<div>Y</div> yttrium 88.906	<div>Zr</div> zirconium 91.224	<div>Nb</div> niobium 92.906	<div>Mo</div> molybdenum 95.95	<div>Tc</div> technetium [88]	<div>Ru</div> ruthenium 101.07	<div>Rh</div> rhodium 102.91	<div>Pd</div> palladium 106.42	<div>Ag</div> silver 107.87	<div>Cd</div> cadmium 112.41	<div>In</div> indium 114.82	<div>Sn</div> tin 118.71	<div>Sb</div> antimony 121.76	<div>Te</div> tellurium 127.6	<div>I</div> iodine 126.9	<div>Xe</div> xenon 131.29																																		
5	<div>Cs</div> cesium 132.91	<div>Ba</div> barium 137.33	lanthanoids		<div>Hf</div> hafnium 178.49	<div>Ta</div> tantalum 180.95	<div>W</div> tungsten 183.84	<div>Re</div> rhenium 186.21	<div>Os</div> osmium 190.23	<div>Ir</div> iridium 192.22	<div>Pt</div> platinum 195.08	<div>Au</div> gold 196.97	<div>Hg</div> mercury 200.59	<div>Tl</div> thallium 204.38	<div>Pb</div> lead 207.2	<div>Bi</div> bismuth 208.98	<div>Po</div> polonium [209]	<div>At</div> astatine [210]	<div>Rn</div> radon [222]																																	
6	<div>Fr</div> francium [223]	<div>Ra</div> radium [226]	actinoids		<div>Rf</div> rutherfordium [261]	<div>Db</div> dubnium [262]	<div>Sg</div> seaborgium [266]	<div>Bh</div> bohrium [269]	<div>Hs</div> hassium [270]	<div>Mt</div> meitnerium [278]	<div>Ds</div> darmstadtium [281]	<div>Rg</div> roentgenium [282]	<div>Cn</div> coppernickel [285]	<td><div>Nh</div>nihonium [286]</td> <td><div>Fl</div>flerovium [289]</td> <td><div>Mc</div>moscovium [290]</td> <td><div>Lv</div>livermorium [293]</td> <td><div>Ts</div>tennessine [294]</td> <td><div>Og</div>oganeson [294]</td> <td colspan="2"></td>	<div>Nh</div> nihonium [286]	<div>Fl</div> flerovium [289]	<div>Mc</div> moscovium [290]	<div>Lv</div> livermorium [293]	<div>Ts</div> tennessine [294]	<div>Og</div> oganeson [294]																																

```
\pgfPT[show periodic variations,cell style=pgfPTR]
```

1	2											13	14	15	16	17	18		
1	H															2			
2	Li	Be											B	C	N	O	F	Ne	
3	Na	Mg											Al	Si	P	S	Cl	Ar	
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr	
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	
6	Cs	Ba	Lanthanoids		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
7	Fr	Ra	Actinoids		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og

\pgfPT[show periodic variations,cell style=pgfPTREi]



varR color

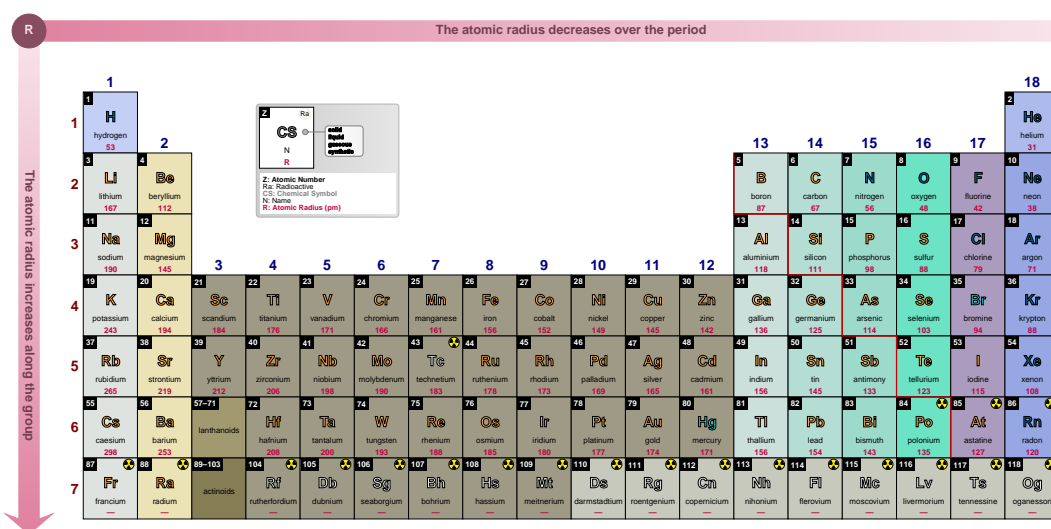
default: RGB: 128,191,191

Sets the color used in the filling of the *arrows* for the atomic radius variations.

NOTE:

The color provided to **varR color** could be any defined color via the command `\definecolor` or by *mixing* colors, using, for instance, the syntax `color1!value!color2`, as explained in the [xcolor](#) package documentation.

\pgfPT[show periodic variations,cell style=pgfPTR,varR color=teal,R color=purple]

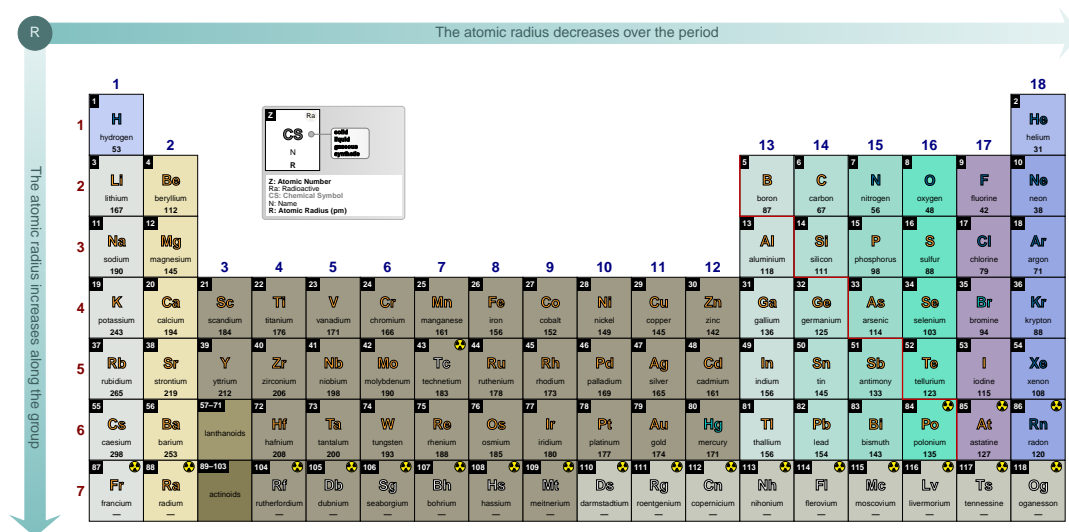


varR font

default: \footnotesize\bfseries

Sets the font for the text displayed inside the arrow, describing the variation of the atomic radius.

\pgfPT[show periodic variations,cell style=pgfPTR,varR font=\small\itshape]

**varR font color**default: (value of varR color)!50!black

Sets the color of the text showing the atomic radius variations displayed inside the corresponding arrows.

See the note in *varR color*.

varEi colordefault: RGB: 128,191,191

Sets the color used in the filling of the *arrows* for the ionization energy variations.

See the note in *varR color*.

varEi font

default: \footnotesize\bfseries

Sets the font for the text displayed inside the arrow, describing the variation of the ionization energy.

varEi font colordefault: (value of varEi color)!50!black

Sets the color of the text showing the ionization energy variations displayed inside the corresponding arrows.

See the note in *varR color*.

vareaff colordefault: RGB: 128,191,191

Sets the color used in the filling of the *arrows* for the electron affinity variations.

See the note in *varR color*.

vareaff font

default: \footnotesize\bfseries

Sets the font for the text displayed inside the arrow, describing the variation of the electron affinity.

vareaff font colordefault: (value of vareaff color)!50!black

Sets the color of the text showing the electron affinity variations displayed inside the corresponding arrows.

See the note in *varR color*.

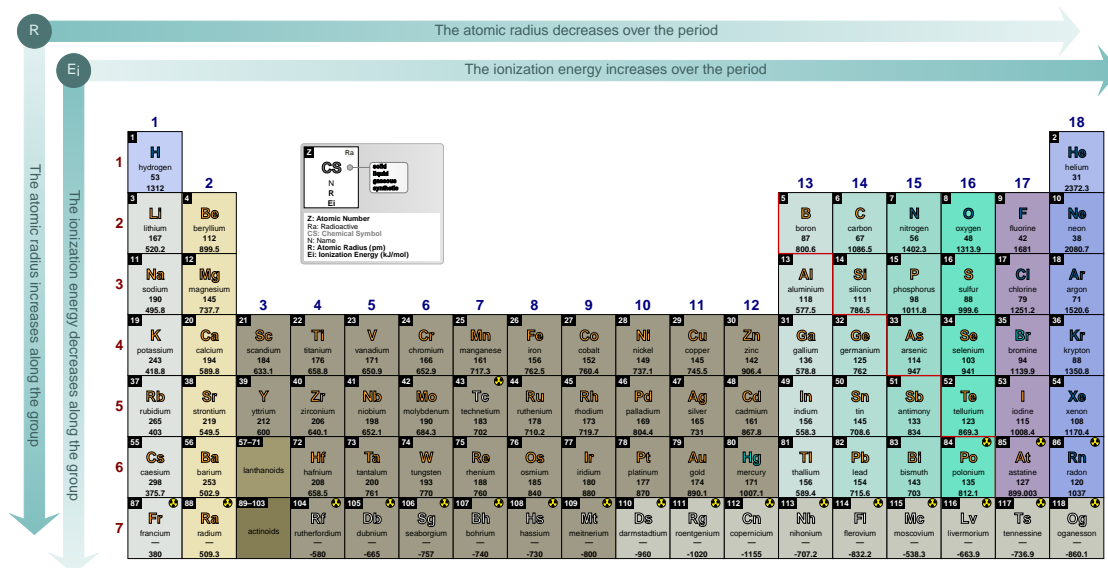
var font

default: \footnotesize\bfseries

Style to set a common font for the variations along the Periodic Table.

Setting `var font=` is equivalent to setting `{varR font=, varEi font=, vareaff font=}`.

\pgfPT[show periodic variations,cell style=pgfPTREi,var font=\small\itshape]



var color

default: RGB: 128,191,191

Style to set a common color for the variations along the Periodic Table.

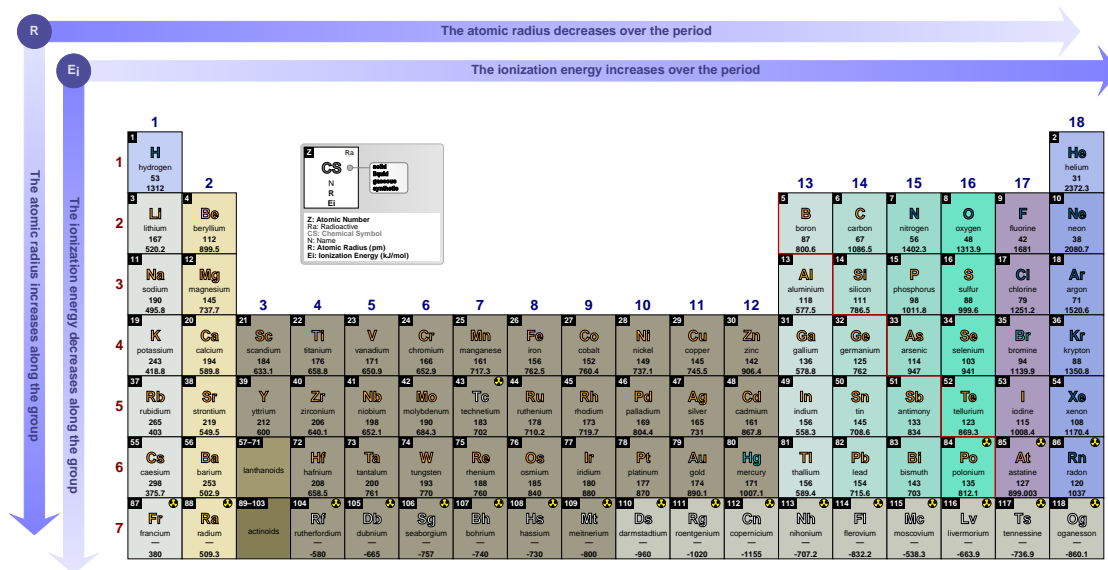
Setting `var color=<color>` is equivalent to setting `{varR color=<color>,varEi color=<color>,vareaff color=<color>}`.

NOTE:

The color provided to `var color` could be any defined color via the command `\definecolor` or by *mixing* colors, using, for instance, the syntax `color1!value!color2`, as explained in the `xcolor` package documentation.

Keep in mind that setting the variations colors also changes the default text colors for them.

\pgfPT[show periodic variations,cell style=pgfPTREi,var color=blue!50!white]



varRdefault: $\{c=colorvariations,f=\footnotesize\bfseries\}$

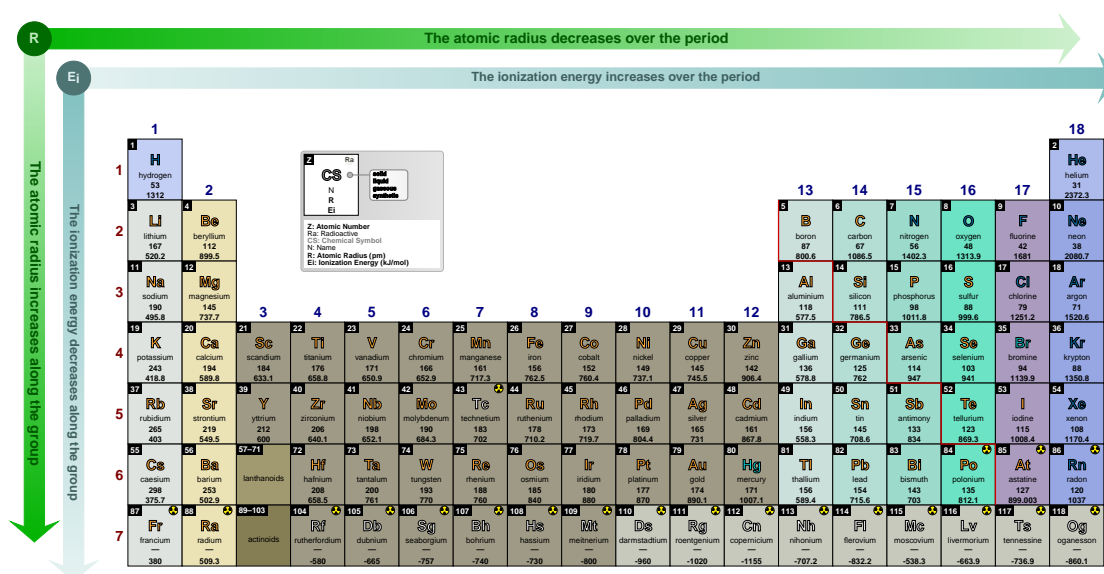
Pseudo style to set the keys: varR color, varR font and/or varR font color. None of the keys – c, f and fc – are mandatory.

NOTE:

The color provided to varR color could be any defined color via the command \definecolor or by mixing colors, using, for instance, the syntax color1!value!color2, as explained in the xcolor package documentation.

USAGE: varR={c=<color>,f=,fc=<color>}

\pgfPT[show periodic variations,cell style=pgfPTREi,
varR={c=green!70!black,f=\small\bfseries}]

**varEi**default: $\{c=colorvariations,f=\footnotesize\bfseries\}$

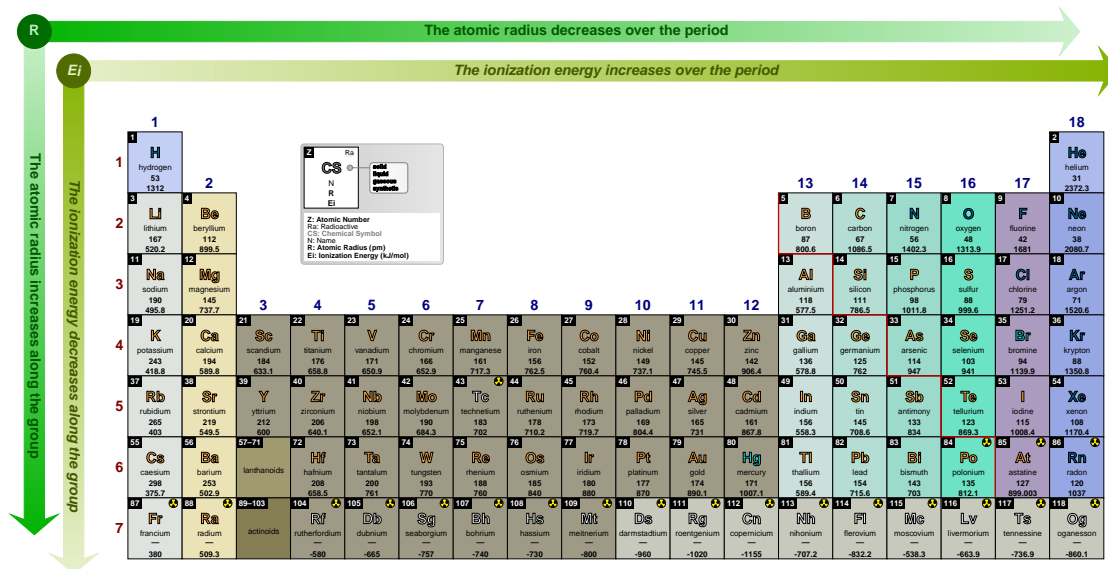
Pseudo style to set the keys: varEi color, varEi font and/or varEi font color. None of the keys – c, f and fc – are mandatory.

NOTE:

The color provided to varEi color could be any defined color via the command \definecolor or by mixing colors, using, for instance, the syntax color1!value!color2, as explained in the xcolor package documentation.

USAGE: varEi={c=<color>,f=,fc=<color>}

\pgfPT[show periodic variations,cell style=pgfPTREi,
varR={c=green!70!black,f=\small\bfseries},
varEi={c=lime!70!black,f=\small\bfseries}]

**vareaff**default: $\{c=colorvariations,f=\footnotesize\bfseries\}$

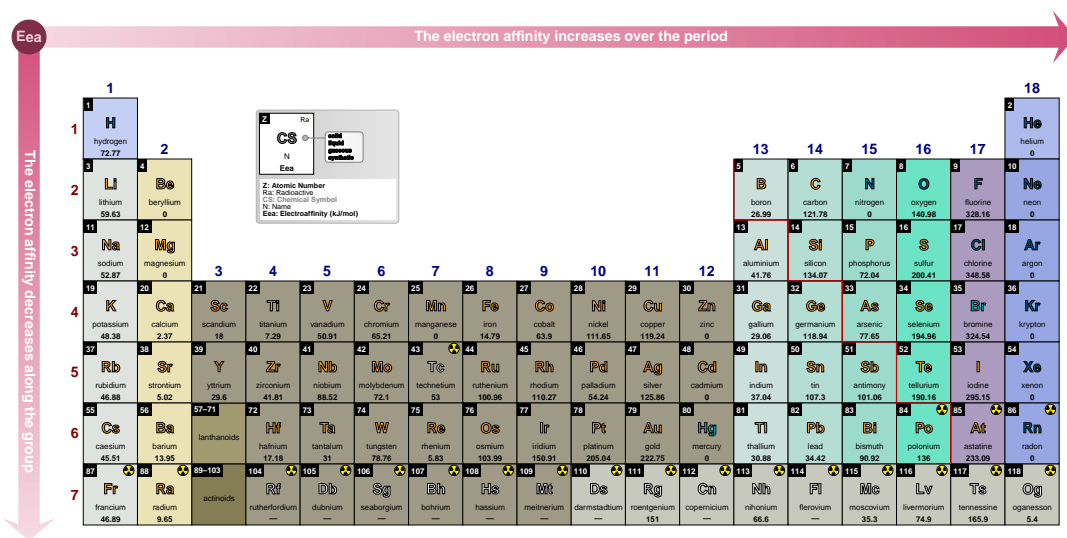
Pseudo style to set the keys: `vareaff color`, `vareaff font` and/or `vareaff font color`. None of the keys – `c`, `f` and `fc` – are mandatory.

NOTE:

The color provided to `vareaff color` could be any defined color via the command `\definecolor` or by *mixing* colors, using, for instance, the syntax `color1!value!color2`, as explained in the `xcolor` package documentation.

USAGE: `vareaff={c=<color>,f=,fc=<color>}`

`\pgfPT[show periodic variations,cell style=pgfPTeaff,
vareaff={c=purple!70!white,f=\small\bfseries,fc=white}]`

`\pgfPTresetstyle`➡ **Dark mode**

dark modedefault: *no value*

Style to change the overall appearance of the Periodic Table to a dark mode suitable for on-screen viewing.

This style sets the following keys with the values:

back color scheme=solid, back color=black!80, cell line color=black!10, CS outline color=white, cell color=white, Z backcolor=black!30, Z color=black, background={fill=black}, varR font color=black!20, varEi font color=black!20, vareaff font color=black!20, per+gr={c=white}, title color=white, other languages color=black!40, legend={bc=black!70,radio=white,CS=white,Z=white,pins style={draw=white,right color=black!75, left color=black!60,line width=.05pt,rounded corners=2pt},extra style={draw=white,fill=black!70,line width=.05pt, rounded corners=2pt},box={left color=black!70,right color=black!40,draw=white}}

\pgfPT[**dark mode**]

Periodic Table of Elements

Exercise layout

The **keys** described in this section enable the *exercise layout* of the Periodic Table, *i.e.*, in this mode the *structure* of the Periodic Table is drawn, but there are only a few contents available in the cells.

only cellsdefault: *false*

When set to **true** the Periodic Table is drawn with only the cells without any contents.

NOTE:

The following **keys** are also set: *back color scheme=solid, show title=false, show period numbers=false, show group numbers=false, show legend=false, show MNM line=false*

`\pgfPT[only cells]`

`\pgfPT[Z list={1,...,54},only cells]`

only cells plus Zdefault: *false*

When set to **true** the Periodic Table is drawn with only the cells without any contents, except the atomic number (Z).

NOTE:

The following keys are also set: back color scheme=solid, show title=false, show period numbers=false, show group numbers=false, show legend=false, show MNM line=false

[illegible][illegible]

default: *false*

NOTE:

The following keys are also set: back color=solid, show title=false, show legend=false, show MNM line=false

`\pgfPT[Z list={1,...,36},only cells with periods and group numbers]`

1																	18
2		2											13	14	15	16	17
3																	
4																	

only cells with periods and group numbers plus Z

default: *false*

When set to *true* the Periodic Table is drawn with only the cells without any contents, except the atomic number (Z). The period and group numbers are shown.

NOTE:

The following keys are also set: *back color scheme=solid*, *show title=false*, *show legend=false*, *show MNM line=false*

`\pgfPT[Z list={1,...,36},only cells with periods and group numbers plus Z]`

1																	18
2		2											13	14	15	16	17
3																	
4																	

Z exercise list

default: `{}`

Sets the list of atomic numbers to display as letters instead of their chemicals symbols.

NOTES:

- ✓ When values are provided to the *Z exercise list* and none of the above *exercise layout* is set, the *exercise layout only cells* is used.
- ✓ The line dots – ... – notation is not available in the *Z exercise list*, mainly to avoid *errors* on the desired list. For example `{1,...,4,8,...,16}` is expanded by the `\foreach` statement of `TikZ` to `{1,2,3,4,8,15}` instead of `{1,2,3,4,8,9,10,11,12,13,14,15,16}`. For achieving that purpose it must be typed `{1,...,4,8,9,...,16}`. Since the goal of *Z exercise list* is typing only a list of specific elements, it will often be easier to type element by element.

`\pgfPT[Z exercise list={1,2,3,4,9,12,17,18,19,20,25,27,32,34,35,49,54,74,86,87},
cell size=3em,Z list={1,...,36}]`

A																	B
C	D															E	
	F															G	H
I	J					K		L					M		N	O	

```
\pgfPT[Z exercise list={1,2,3,4,9,12,17,18,19,20,25,27,32,34,35,49,54,74,86,87},
cell size=3em,Z list={1,...,36},only cells with periods and group numbers]
```

	1																18
1	A																B
		2															
2	C	D															
3		F															
			3	4	5	6	7	8	9	10	11	12					
4	I	J					K		L					M		N	O

exercise list in capitalsdefault: *true*When set to *true* the *letters* are typed in capitals, otherwise they are typed as lowercase letters.

```
\pgfPT[Z exercise list={1,2,3,4,9,12,17,18,19,20,25,27,32,34,35,49,54,74,86,87},
cell size=3em,Z list={1,...,36},exercise list in capitals=false]
```

	a																b
	c	d															
		f															
i	j					k		l					m		n	o	

exercise list colordefault: *black*Sets the color of the displayed *letters* in the *exercise layout*.

```
\pgfPT[Z exercise list={1,2,3,4,9,12,17,18,19,20,25,27,32,34,35,49,54,74,86,87},
cell size=3em,Z list={1,...,36}, exercise list color=blue!50!black]
```

	A																B
	C	D															
		F															
I	J					K		L					M		N	O	

exercise list fontdefault: `\bfseries\large`Sets the font of the displayed *letters* in the *exercise layout*.

```
\pgfPT[Z exercise list={1,2,3,4,9,12,17,18,19,20,25,27,32,34,35,49,54,74,86,87},
cell size=3em,Z list={1,...,36}, exercise list font=\fontfamily{fmm}\selectfont]
```

	\mathcal{A}																\mathcal{B}
	\mathcal{C}	\mathcal{D}															
		\mathcal{F}															
\mathcal{I}	\mathcal{J}					\mathcal{K}		\mathcal{L}					\mathcal{M}		\mathcal{N}	\mathcal{O}	

no value

`\pgfPT[cells+Z]`

[illegible]

no value

`\pgfPT[cells+p+g]`

[illegible]

no value

`\pgfPT[cells+p+g+Z]`

[illegible]

no value

`\pgfPT[Z exercise list={1,2,3,4,9,12,17,18,19,20,25,27,32,34,35,49,54,74,86,87},
cell size=3em,Z list={1,...,36},exnocaps]`

a																b	
c	d															e	
	f															g	h
i	j					k		l					m		n	o	

default: *black*

`\pgfPT[Z exercise list={1,2,3,4,9,12,17,18,19,20,25,27,32,34,35,49,54,74,86,87},
cell size=3em,Z list={1,...,36},exColor=red!50!black]`

A														B			
C	D														E		
	F														G	H	
I	J					K		L					M		N	O	

exFontdefault: `\bfseries\large`Style to set the key **exercise list font**.

```
\pgfPT[Z exercise list={1,2,3,4,9,12,17,18,19,20,25,27,32,34,35,49,54,74,86,87},
cell size=3em,Z list={1,...,36},exFont=\Large]
```

A																			B
C	D																E		
	F																G	H	
I	J						K		L					M		N	O		

exdefault: `{caps=true,c=black,f=\bfseries\large}`

Pseudo style to set the keys: exercise list in **capitals**, exercise list **color** and/or exercise list **font**. None of the keys – caps, c and f – are mandatory.

USAGE: `ex={caps=<true|false>,c=<color>,f=}`

```
\pgfPT[Z exercise list={1,2,3,4,9,12,17,18,19,20,25,27,32,34,35,49,54,74,86,87},
cell size=3em,Z list={1,...,36},ex={c=blue,f=\Large\bfseries}]
```

A																			B
C	D																E		
	F																G	H	
I	J						K		L					M		N	O		

✂ Cell contents options: keys, styles and *pseudo styles*

The following options and styles are used for customizing the contents available in each individual cell of the Periodic Table, like the *fonts* or the *colors* used in the shown contents.

➡ The atomic number

Z backcolordefault: *black*

Sets the background color of the box where the atomic number is displayed.

```
\pgfPT[Z list={1,...,36},Z backcolor=blue!70!black]
```

Periodic Table of Elements

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 H hydrogen 1.008	2 He helium 4.0026																
3 Li lithium 6.94	4 Be beryllium 9.0122											5 B boron 10.81	6 C carbon 12.011	7 N nitrogen 14.007	8 O oxygen 15.999	9 F fluorine 18.998	10 Ne neon 20.18
11 Na sodium 22.99	12 Mg magnesium 24.305											13 Al aluminum 26.982	14 Si silicon 28.085	15 P phosphorus 30.974	16 S sulfur 32.06	17 Cl chlorine 35.45	18 Ar argon 39.95
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798

Z colordefault: *white*

Sets the color of the atomic number.

`\pgfPT[Z list={1,...,36},Z bgcolor=black!30,Z color=black]`

Periodic Table of Elements

1

1

H

hydrogen

1.008

2

3

4

Li

lithium

6.94

5

6

7

8

9

10

11

12

13

14

15

16

17

18

He

helium

4.0026

Z

CS

N

Ar

radioactive element synthesis

Z: Atomic Number

Ra: Radioactive

CS: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

K

potassium

39.098

Ca

calcium

40.078

Sc

scandium

44.956

Ti

titanium

47.867

V

vanadium

50.942

Cr

chromium

51.996

Mn

manganese

54.938

Fe

iron

55.845

Co

cobalt

58.933

Ni

nickel

58.693

Cu

copper

63.546

Zn

zinc

65.38

Ga

gallium

69.723

Ge

germanium

72.63

As

arsenic

74.922

Se

selenium

78.971

Br

bromine

79.904

Kr

krypton

83.798

Z fontdefault: `\tiny\bfseries`

Sets the font of the atomic number.

`\pgfPT[Z list={1,...,36},Z font=\fontfamily{pag}\selectfont\tiny]`

Periodic Table of Elements

The periodic table shows elements with atomic numbers 1 to 36. The atomic numbers are displayed in a very small, bold, serif font. The element names and symbols are in white. A legend box shows the format for Z, Ra, CS, N, and Ar.

1	2																	18
1 H hydrogen 1.008																	2 He helium 4.0026	
3 Li lithium 6.94	4 Be beryllium 9.0122																	
11 Na sodium 22.99	12 Mg magnesium 24.305																	
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798	

Z use box widthdefault: *false*If true, the width specified in the constructed cell is used, otherwise, the *natural* width of the box containing Z value is used.`\pgfPT[Z list={1,...,36},Z use box width]`

Periodic Table of Elements

The periodic table shows elements with atomic numbers 1 to 36. The atomic numbers are displayed in a font that uses the specified box width. The element names and symbols are in white. A legend box shows the format for Z, Ra, CS, N, and Ar.

1	2																	18
1 H hydrogen 1.008																	2 He helium 4.0026	
3 Li lithium 6.94	4 Be beryllium 9.0122																	
11 Na sodium 22.99	12 Mg magnesium 24.305																	
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798	

Z aligndefault: *left*Sets the alignment of the atomic number value to *left*, *center* or *right* with respect to its containing box. It only takes effect when **Z use box width** is **true**.


```
\pgfPT[Z list={1,...,36},Z={bc=blue,f=\tiny\bfseries\itshape}]
```

Periodic Table of Elements

1

1

H

hydrogen

1.008

2

2

He

helium

4.0026

3

Li

lithium

6.94

4

Be

beryllium

9.0122

5

B

boron

10.81

6

C

carbon

12.011

7

N

nitrogen

14.007

8

O

oxygen

15.999

9

F

fluorine

18.998

10

Ne

neon

20.18

11

Na

sodium

22.99

12

Mg

magnesium

24.305

13

Al

aluminum

26.982

14

Si

silicon

28.085

15

P

phosphorus

30.974

16

S

sulfur

32.06

17

Cl

chlorine

35.45

18

Ar

argon

39.95

19

K

potassium

39.098

20

Ca

calcium

40.078

21

Sc

scandium

44.956

22

Ti

titanium

47.867

23

V

vanadium

50.942

24

Cr

chromium

51.996

25

Mn

manganese

54.938

26

Fe

iron

55.845

27

Co

cobalt

58.933

28

Ni

nickel

58.693

29

Cu

copper

63.546

30

Zn

zinc

65.38

31

Ga

gallium

69.723

32

Ge

germanium

72.63

33

As

arsenic

74.922

34

Se

selenium

78.971

35

Br

bromine

79.904

36

Kr

krypton

83.798

Z: Atomic Number

R: Radioactive

CS: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

2

He

helium

4.0026

→ The chemical symbol

CS solid

default:  RGB: 255,166,51

Sets the color of the chemical symbol for elements that are in the solid state at normal temperature and pressure (NTP).

```
\pgfPT[Z list={1,...,54},CS solid=red]
```

Periodic Table of Elements

1

H

hydrogen

1.008

2

He

helium

4.0026

3

Li

lithium

6.94

4

Be

beryllium

9.0122

5

B

boron

10.81

6

C

carbon

12.011

7

N

nitrogen

14.007

8

O

oxygen

15.999

9

F

fluorine

18.998

10

Ne

neon

20.18

11

Na

sodium

22.99

12

Mg

magnesium

24.305

13

Al

aluminum

26.982

14

Si

silicon

28.085

15

P

phosphorus

30.974

16

S

sulfur

32.06

17

Cl

chlorine

35.45

18

Ar

argon

39.95

19

K

potassium

39.098

20

Ca

calcium

40.078

21

Sc

scandium

44.956

22

Ti

titanium

47.867

23

V

vanadium

50.942

24

Cr

chromium

51.996

25

Mn

manganese

54.938

26

Fe

iron

55.845

27

Co

cobalt

58.933

28

Ni

nickel

58.693

29

Cu

copper

63.546

30

Zn

zinc

65.38

31

Ga

gallium

69.723

32

Ge

germanium

72.63

33

As

arsenic

74.922

34

Se

selenium

78.971

35

Br

bromine

79.904

36

Kr

krypton

83.798

37

Rb

rubidium

85.468

38

Sr

strontium

87.62

39

Y

yttrium

88.906

40

Zr

zirconium

91.224

41

Nb

niobium

92.906

42

Mo

molybdenum

95.95

43

Tc

technetium

98

44

Ru

ruthenium

101.07

45

Rh

rhodium

102.91

46

Pd

palladium

106.42

47

Ag

silver

107.87

48

Cd

cadmium

112.41

49

In

indium

114.82

50

Sn

tin

118.71

51

Sb

antimony

121.76

52

Te

tellurium

127.6

53

I

iodine

126.9

54

Xe

xenon

131.29

2

CS

N

Ar

radioactive

chemical symbol

name

relative atomic mass

Z: Atomic Number

R: Radioactive

CS: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

CS liquid

default:  RGB: 0,204,204

Sets the color of the chemical symbol for elements that are in a liquid state at normal temperature and pressure (NTP).

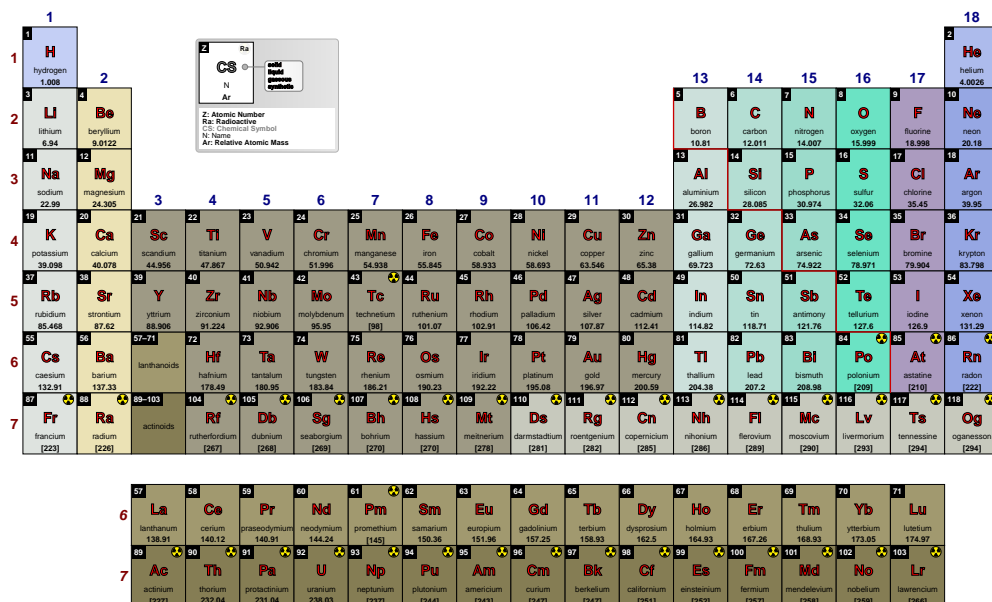
```
\pgfPT[Z list={1,...,54},CS liquid=red]
```

Periodic Table of Elements

1																	18					
1	H																	He				
	hydrogen																	helium				
	1.008																	4.0026				
2	Li	Be															B	C	N	O	F	Ne
	lithium	beryllium															boron	carbon	nitrogen	oxygen	fluorine	neon
	6.94	9.0122															10.81	12.011	14.007	15.999	18.998	20.18
3	Na	Mg															Al	Si	P	S	Cl	Ar
	sodium	magnesium															aluminum	silicon	phosphorus	sulfur	chlorine	argon
	22.99	24.305															26.982	28.085	30.974	32.06	35.45	39.95
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr				
	potassium	calcium	scandium	titanium	vanadium	chromium	manganese	iron	cobalt	nickel	copper	zinc	gallium	germanium	arsenic	selenium	bromine	krypton				
	39.098	40.078	44.956	47.867	50.942	51.996	54.938	55.845	58.933	58.693	63.546	65.38	69.723	72.63	74.922	78.971	79.904	83.798				
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe				
	rubidium	strontium	yttrium	zirconium	niobium	molybdenum	technetium	ruthenium	rhodium	palladium	silver	cadmium	indium	tin	antimony	tellurium	iodine	xenon				
	85.468	87.62	88.906	91.224	92.906	95.95	[98]	101.07	102.91	106.42	107.87	112.41	114.82	118.71	121.76	127.6	126.9	131.29				

`\pgfPT[CS all=red]`

Periodic Table of Elements



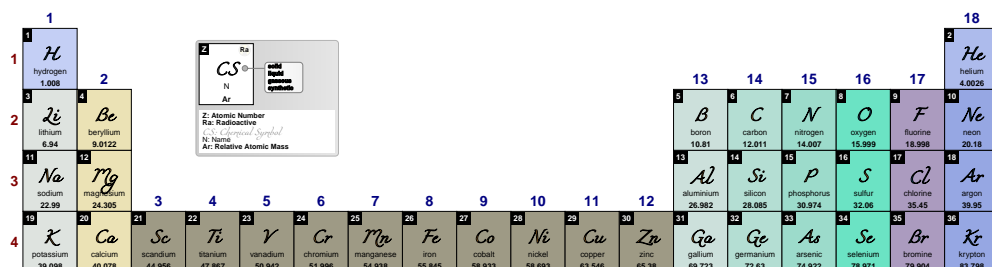
The image shows a periodic table of elements rendered with the CS font and red styling. The elements are arranged in their standard periodic table layout, with atomic numbers, symbols, and names. The font is a serif font, and the styling includes red borders and red text for the element symbols and names. A legend box in the top left corner explains the font and styling options.

CS font

Sets the font for the chemical symbol.

default: `\small\bfseries``\pgfPT[Z list={1,...,36},CS font=\small\fontfamily{fmm}\selectfont]`

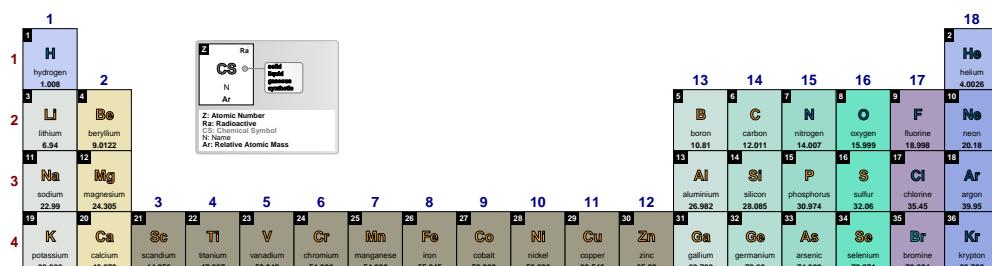
Periodic Table of Elements



The image shows a periodic table of elements rendered with the CS font and red styling. The elements are arranged in their standard periodic table layout, with atomic numbers, symbols, and names. The font is a serif font, and the styling includes red borders and red text for the element symbols and names. A legend box in the top left corner explains the font and styling options.

CS render modeSets the chemical symbol render mode. Available modes are **fill**, **outline** or **fill and outline**.default: *fill and outline*`\pgfPT[Z list={1,...,36}]`

Periodic Table of Elements



The image shows a periodic table of elements rendered with the CS font and red styling. The elements are arranged in their standard periodic table layout, with atomic numbers, symbols, and names. The font is a serif font, and the styling includes red borders and red text for the element symbols and names. A legend box in the top left corner explains the font and styling options.

```
\pgfPT[Z list={1,...,36},CS render mode=fill]
```

Periodic Table of Elements

```
\pgfPT[Z list={1,...,36},CS render mode=outline]
```

Periodic Table of Elements

CS outline colordefault: *black*

Sets the outline color for the chemical symbol.

```
\pgfPT[Z list={1,...,36},CS outline color=red]
```

Periodic Table of Elements

CS outline widthdefault: *0.05*Sets the outline width of the chemical symbol. It is any positive numerical value **without dimensions** (1.0 is roughly 1.0pt).

```
\pgfPT[Z list={1,...,36},CS outline width=.2]
```

Periodic Table of Elements

CS default: $\{r=fill\ and\ outline,c=black,w=.05,f=\small\bfseries,s=solido,l=liquido,g=gasoso,sy=sintetico\}$

Pseudo style to set the keys: CS **render mode**, CS **outline color**, CS **outline width**, CS **font**, CS **solid**, CS **liquid**, CS **gas** and/or CS **synt** and/or the style CS **all**. None of the keys – r, olc, olw, f, s, l, g, sy and all – are mandatory.

USAGE:

CS= $\{r=<fill\ or\ outline\ and\ outline>,olc=<color>,olw=<positive\ numerical\ value>f=<font\ commands>,s=<color>,l=<color>,g=<color>,sy=<color>,all=<color>\}$

$\backslash\pgfPT[Z\ list=\{1,...,36\},CS=\{r=outline,olc=red,olw=.4\},show\ legend\ pins=false]$

Periodic Table of Elements

1	2											18					
1 H hydrogen 1.008												2 He helium 4.0026					
3 Li lithium 6.94	4 Be beryllium 9.0122											13 B boron 10.81	14 C carbon 12.011	15 N nitrogen 14.007	16 O oxygen 15.999	17 F fluorine 18.998	18 Ne neon 20.18
11 Na sodium 22.99	12 Mg magnesium 24.305											13 Al aluminum 26.982	14 Si silicon 28.085	15 P phosphorus 30.974	16 S sulfur 32.06	17 Cl chlorine 35.45	18 Ar argon 39.95
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798

The name

name colordefault: *black*

Sets the color of the element name.

 $\backslash\pgfPTstyle[show\ title=false]$
 $\backslash\pgfPT[Z\ list=\{1,...,36\},name\ color=red]$

1	2											18					
1 H hydrogen 1.008												2 He helium 4.0026					
3 Li lithium 6.94	4 Be beryllium 9.0122											13 B boron 10.81	14 C carbon 12.011	15 N nitrogen 14.007	16 O oxygen 15.999	17 F fluorine 18.998	18 Ne neon 20.18
11 Na sodium 22.99	12 Mg magnesium 24.305											13 Al aluminum 26.982	14 Si silicon 28.085	15 P phosphorus 30.974	16 S sulfur 32.06	17 Cl chlorine 35.45	18 Ar argon 39.95
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798

name fontdefault: $\backslash fontseries\backslash selectfont\backslash tiny$

Sets the font of the element name.

 $\backslash\pgfPT[Z\ list=\{1,...,36\},name\ font=\backslash itshape\backslash tiny]$

1	2											18					
1 H hydrogen 1.008												2 He helium 4.0026					
3 Li lithium 6.94	4 Be beryllium 9.0122											13 B boron 10.81	14 C carbon 12.011	15 N nitrogen 14.007	16 O oxygen 15.999	17 F fluorine 18.998	18 Ne neon 20.18
11 Na sodium 22.99	12 Mg magnesium 24.305											13 Al aluminum 26.982	14 Si silicon 28.085	15 P phosphorus 30.974	16 S sulfur 32.06	17 Cl chlorine 35.45	18 Ar argon 39.95
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798

name aligndefault: *center*

Sets the alignment of the element name to *left*, *center* or *right* with respect to its containing box.

(new in v1.0.1)`\pgfPT[Z list={1,...,36},name align=left]`

1	2											18					
1 H hydrogen 1.008																2 He helium 4.0026	
3 Li lithium 6.94	4 Be beryllium 9.0122											13 B boron 10.81	14 C carbon 12.011	15 N nitrogen 14.007	16 O oxygen 15.999	17 F fluorine 18.998	18 Ne neon 20.18
11 Na sodium 22.99	12 Mg magnesium 24.305											13 Al aluminum 26.982	14 Si silicon 28.085	15 P phosphorus 30.974	16 S sulfur 32.06	17 Cl chlorine 35.45	18 Ar argon 39.95
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798

capitalize element namesdefault: *false*

If set to **true** the first letter of the name of the elements is a capital letter. If set to **TRUE** the whole name of the elements is in capital letters

(changed in v1.0.1)`\pgfPT[Z list={1,...,36},capitalize element names=true]`

1	2											18					
1 H Hydrogen 1.008																2 He Helium 4.0026	
3 Li Lithium 6.94	4 Be Beryllium 9.0122											13 B Boron 10.81	14 C Carbon 12.011	15 N Nitrogen 14.007	16 O Oxygen 15.999	17 F Fluorine 18.998	18 Ne Neon 20.18
11 Na Sodium 22.99	12 Mg Magnesium 24.305											13 Al Aluminum 26.982	14 Si Silicon 28.085	15 P Phosphorus 30.974	16 S Sulfur 32.06	17 Cl Chlorine 35.45	18 Ar Argon 39.95
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.63	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 83.798

`\pgfPT[Z list={1,...,36},capitalize element names=TRUE]`

1

H

HYDROGEN

1.008

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

2

He

HELIUM

4.0026

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

3

Li

LITHIUM

6.94

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

4

Be

BERYLLIUM

9.0122

5

6

7

8

9

10

11

12

13

14

15

16

17

18

11

Na

SODIUM

22.99

12

13

14

15

16

17

18

12

Mg

MAGNESIUM

24.305

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

20

Ca

CALCIUM

40.078

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

21

Sc

SCANDIUM

44.956

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

22

Ti

TITANIUM

47.867

23

24

25

26

27

28

29

30

31

32

33

34

35

36

23

V

VANADIUM

50.942

24

25

26

27

28

29

30

31

32

33

34

35

36

24

Cr

CHROMIUM

51.996

25

26

27

28

29

30

31

32

33

34

35

36

25

Mn

MANGANESE

54.938

26

27

28

29

30

31

32

33

34

35

36

26

Fe

IRON

55.845

27

28

29

30

31

32

33

34

35

36

27

Co

COBALT

58.933

28

29

30

31

32

33

34

35

36

28

Ni

NICKEL

58.693

29

30

31

32

33

34

35

36

29

Cu

COPPER

63.546

30

31

32

33

34

35

36

30

Zn

ZINC

65.38

31

32

33

34

35

36

31

Ga

GALLIUM

69.723

32

33

34

35

36

32

Ge

GERMANIUM

72.63

33

34

35

36

33

As

ARSENIC

74.922

34

35

36

34

Se

SELENIUM

78.971

35

36

35

Br

BROMINE

79.904

36

36

Kr

KRYPTON

83.798

Z:

Atomic Number

Rr:

Radioactive

CS:

Chemical Symbol

N:

Name

Ar:

Relative Atomic Mass

CS

N

Ar

radio

isotope

properties

name*no value*

A style equivalent to `capitalize element names=false`

`\pgfPT[Z list={1,...,36},name]`

1	2											18					
1 H hydrogen 1.008																2 He helium 4.0026	
3 Li lithium 6.94	4 Be beryllium 9.0122											13 B boron 10.81	14 C carbon 12.011	15 N nitrogen 14.007	16 O oxygen 15.999	17 F fluorine 18.998	18 Ne neon 20.18
11 Na sodium 22.99	12 Mg magnesium 24.305											13 Al aluminum 26.982	14 Si silicon 28.085	15 P phosphorus 30.974	16 S sulfur 32.06	17 Cl chlorine 35.45	18 Ar argon 39.95
19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.63	33 As arsenic 74.922	34 Se selenium 78.971	35 Br bromine 79.904	36 Kr krypton 83.798

Name*no value*A style equivalent to `capitalize element names=true``\pgfPT[Z list={1,...,36},Name]`

1

H

Hydrogen
1.008

2

3

4

Li

Be

Lithium
6.94

Beryllium
9.0122

5

6

7

8

9

10

11

12

Na

Mg

Sodium
22.99

Magnesium
24.305

13

14

15

16

17

18

B

C

N

O

F

Ne

Boron
10.81

Carbon
12.011

Nitrogen
14.007

Oxygen
15.999

Fluorine
18.998

Neon
20.18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

K

Ca

Sc

Ti

V

Cr

Mn

Fe

Co

Ni

Cu

Zn

Ga

Ge

As

Se

Br

Kr

Potassium
39.098

Calcium
40.078

Scandium
44.956

Titanium
47.88

Vanadium
50.942

Chromium
51.996

Manganese
54.938

Iron
55.845

Cobalt
58.933

Nickel
58.693

Copper
63.546

Zinc
65.38

Gallium
69.723

Germanium
72.63

Arsenic
74.922

Selenium
78.96

Bromine
79.904

Krypton
83.90

2

He

Helium
4.0026

13

Al

Aluminum
26.982

14

Si

Silicon
28.085

15

P

Phosphorus
30.974

16

S

Sulfur
32.06

17

Cl

Chlorine
35.45

18

Ar

Argon
39.95

Z: Atomic Number

Ra: Radioactive

CS: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

CS

⊕

Ar

radio
isotopes
synthesis

NAME*no value*A style equivalent to `capitalize element names=TRUE`*(new in v1.0.1)*`\pgfPT[Z list={1,...,36},NAME]`

1																	18	
1	H																	He
	HYDROGEN																	HELIUM
2	Li	Be															Ne	
	LITHIUM	BERYLLIUM															NEON	
3	Na	Mg															Ar	
	SODIUM	MAGNESIUM															ARGON	
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	POTASSIUM	CALCIUM	SCANDIUM	TITANIUM	VANADIUM	CHROMIUM	MANGANESE	IRON	COBALT	NICKEL	COPPER	ZINC	GALLIUM	GERMANIUM	ARSENIC	SELENIUM	BROMINE	KRYPTON

► The atomic weight

Ar colordefault: *black*

Sets the relative atomic mass color.

`\pgfPT[Z list={1,...,36},Ar color=red]`

1																	18	
1	H																	He
	hydrogen																	helium
2	Li	Be															Ne	
	lithium	beryllium															neon	
3	Na	Mg															Ar	
	sodium	magnesium															argon	
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	potassium	calcium	scandium	titanium	vanadium	chromium	manganese	iron	cobalt	nickel	copper	zinc	gallium	germanium	arsenic	selenium	bromine	krypton

Ar fontdefault: `\tiny\bfseries`

Sets the relative atomic mass font.

`\pgfPT[Z list={1,...,36},Ar font=\scriptsize\bfseries]`

1

H

hydrogen

1.008

2

He

helium

4.0026

3

Li

lithium

6.94

4

Be

beryllium

9.0122

5

B

boron

10.81

6

C

carbon

12.011

7

N

nitrogen

14.007

8

O

oxygen

15.999

9

F

fluorine

18.998

10

Ne

neon

20.18

11

Na

sodium

22.99

12

Mg

magnesium

24.305

13

Al

aluminum

26.982

14

Si

silicon

28.085

15

P

phosphorus

30.974

16

S

sulfur

32.06

17

Cl

chlorine

35.45

18

Ar

argon

39.95

19

K

potassium

39.098

20

Ca

calcium

40.078

21

Sc

scandium

44.956

22

Ti

titanium

47.867

23

V

vanadium

50.942

24

Cr

chromium

51.996

25

Mn

manganese

54.938

26

Fe

iron

55.845

27

Co

cobalt

58.933

28

Ni

nickel

58.693

29

Cu

copper

63.546

30

Zn

zinc

65.38

31

Ga

gallium

69.723

32

Ge

germanium

72.63

33

As

arsenic

74.922

34

Se

selenium

78.971

35

Br

bromine

79.904

36

Kr

krypton

83.798

2

Ra

</

Ar labeldefault: `m`

Sets the label to be used within the relative atomic mass description. When set to 'm' the term **mass** is used and when set to 'w' the term **weight** is used, resulting in *Relative Atomic Mass* and *Atomic Weight* labels respectively.

`\pgfPT[Z list={1,...,36}]`

1

H

hydrogen

1.008

2

He

helium

4.0026

3

Li

lithium

6.94

4

Be

beryllium

9.0122

5

B

boron

10.81

6

C

carbon

12.011

7

N

nitrogen

14.007

8

O

oxygen

15.999

9

F

fluorine

18.998

10

Ne

neon

20.18

11

Na

sodium

22.99

12

Mg

magnesium

24.305

13

Al

aluminium

26.982

14

Si

silicon

28.085

15

P

phosphorus

30.974

16

S

sulfur

32.06

17

Cl

chlorine

35.45

18

Ar

argon

39.95

19

K

potassium

39.098

20

Ca

calcium

40.078

21

Sc

scandium

44.956

22

Ti

titanium

47.867

23

V

vanadium

50.942

24

Cr

chromium

51.996

25

Mn

manganese

54.938

26

Fe

iron

55.845

27

Co

cobalt

58.933

28

Ni

nickel

58.693

29

Cu

copper

63.546

30

Zn

zinc

65.38

31

Ga

gallium

69.723

32

Ge

germanium

72.63

33

As

arsenic

74.922

34

Se

selenium

78.971

35

Br

bromine

79.904

36

Kr

krypton

83.798

2

Ra

CS

N

Ar

radioactive

chemical symbol

name

relative atomic mass

Z: Atomic Number

Ra: Radioactive

CS: Chemical Symbol

N: Name

Ar: Relative Atomic Mass

`\pgfPT[Z list={1,...,36},Ar label=w]`

1																	18					
1	H																	He				
	hydrogen																	helium				
	1.008																	4.0026				
2	Li	Be															B	C	N	O	F	Ne
	lithium	beryllium															boron	carbon	nitrogen	oxygen	fluorine	neon
	6.94	9.0122															10.81	12.011	14.007	15.999	18.998	20.18
3	Na	Mg															Al	Si	P	S	Cl	Ar
	sodium	magnesium															aluminum	silicon	phosphorus	sulfur	chlorine	argon
	22.99	24.305															26.982	28.085	30.974	32.06	35.45	39.95
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr				
	potassium	calcium	scandium	titanium	vanadium	chromium	manganese	iron	cobalt	nickel	copper	zinc	gallium	germanium	arsenic	selenium	bromine	krypton				
	39.098	40.078	44.956	47.867	50.942	51.996	54.938	55.845	58.933	58.693	63.546	65.38	69.723	72.63	74.922	78.971	79.904	83.798				

Ar precisiondefault: `-1`

Sets the relative atomic mass precision, *i.e.*, the decimal places displayed in the relative atomic mass value, performing the respective rounding, without zero padding the value.

NOTE:

Rounding is performed over the relative atomic mass data values which actually have a maximum of 4 decimal places. So giving this key a value of -1 (the value of relative atomic mass as-is) or 4 has the same effect.

Therefore the values provided to this key should be any integer between -1 and 3, *i.e.*, -1, 0, 1, 2 or 3. Any other integer provided will be processed as -1.

\pgfPT[Z list={1,...,36}]

\pgfPT[Z list={1,...,36},Ar precision=2]

\pgfPT[Z list={1,...,36},Ar precision=1]

Ar

default: {c=black,f=\tiny\bfseries,l=m,p=-1}

Pseudo style to set the keys: Ar color, Ar font, Ar label and/or Ar precision. None of the keys – c, f, l and p – are mandatory.

USAGE: Ar={c=<color>,f=,l=<m|w>p=<integer value>}

\pgfPT[Z list={1,...,36},Ar={c=red!50!black,p=2}]

```
\pgfPT[Z list={1,...,36},Ar={c=red!50!black,p=1,l=w}]
```

1																	18	
1	H																	2
	hydrogen																helium	
2	Li	Be															10	
	lithium	beryllium															neon	
3	Na	Mg															18	
	sodium	magnesium															argon	
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	potassium	calcium	scandium	titanium	vanadium	chromium	manganese	iron	cobalt	nickel	copper	zinc	gallium	germanium	arsenic	selenium	bromine	krypton

► The density

d color

default: *black*

Sets the density value text color.

```
\pgfPTbuilcellstyle{myd}(5,3)% 5 rows by 3 columns
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-3;d)]
\pgfPT[Z list={1,...,36},cell style=myd,show title=false]
```

1																	18	
1	H																	2
	hydrogen																helium	
2	Li	Be															10	
	lithium	beryllium															neon	
3	Na	Mg															18	
	sodium	magnesium															argon	
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	potassium	calcium	scandium	titanium	vanadium	chromium	manganese	iron	cobalt	nickel	copper	zinc	gallium	germanium	arsenic	selenium	bromine	krypton

```
\pgfPT[Z list={1,...,36},cell style=myd,show title=false,d color=red]
```

1																	18	
1	H																	2
	hydrogen																helium	
2	Li	Be															10	
	lithium	beryllium															neon	
3	Na	Mg															18	
	sodium	magnesium															argon	
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	potassium	calcium	scandium	titanium	vanadium	chromium	manganese	iron	cobalt	nickel	copper	zinc	gallium	germanium	arsenic	selenium	bromine	krypton

d font

default: *\tiny\bfseries*

Sets the density value text font.

```
\pgfPT[Z list={1,...,36},cell style=myd,show title=false]
```

1																	18	
1	H																	2
	hydrogen																helium	
2	Li	Be															10	
	lithium	beryllium															neon	
3	Na	Mg															18	
	sodium	magnesium															argon	
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	potassium	calcium	scandium	titanium	vanadium	chromium	manganese	iron	cobalt	nickel	copper	zinc	gallium	germanium	arsenic	selenium	bromine	krypton

`\pgfPT[Z list={1,...,36},cell style=myd,show title=false,d font=\tiny\itshape]`

Periodic table showing elements 1 to 36. The table includes element symbols, names, atomic numbers, and densities. A legend box shows the cell style 'myd' with a density unit 'g/cm³' and a note 'd: Density (g/cm³; g/dm³ for the gases)'.

d unit

default: *both*

Sets the unit for the density of the elements. The two possible values to this key are **g/dm³** (g/dm³), **g/cm³** (g/cm³) and **both** (g/dm³ for elements in the gaseous state and g/cm³ for all other elements).

`\pgfPT[Z list={1,...,36},cell style=myd,show title=false]`

Periodic table showing elements 1 to 36. The table includes element symbols, names, atomic numbers, and densities. A legend box shows the cell style 'myd' with a density unit 'g/cm³' and a note 'd: Density (g/cm³; g/dm³ for the gases)'.

`\pgfPT[Z list={1,...,36},cell style=myd,show title=false,d unit=g/cm3]`

Periodic table showing elements 1 to 36. The table includes element symbols, names, atomic numbers, and densities. A legend box shows the cell style 'myd' with a density unit 'g/cm³' and a note 'd: Density (g/cm³)'.

`\pgfPT[Z list={1,...,36},cell style=myd,show title=false,d unit=g/dm3]`

Periodic table showing elements 1 to 36. The table includes element symbols, names, atomic numbers, and densities. A legend box shows the cell style 'myd' with a density unit 'g/dm³' and a note 'd: Density (g/dm³)'.

d precision

default: -1

Sets the density precision, *i.e.*, the decimal places displayed in their value, performing the respective rounding, without zero padding the value.

NOTE:

Rounding is performed over density values witch actually have a maximum 5 or 8 decimal places, when the values are in g/dm³ or in g/cm³, respectively.. So giving this key a value of -1 (the value of the melting or boiling point as-is) or 5 or 8 has the same effect.

Therefore the values provided to this key should be any integer between -1 and 4 (g/dm³) or 7 (g/cm³). Any other integer provided will be processed as -1.

\pgfPTstyle[Z list={1,...,54},cell style=myd,show title=false]

\pgfPT

1																	18																		
1	H																	2	He																
	hydrogen																		helium																
	0.08988																		0.1786																
2	Li	4	Be													10	Ne																		
	lithium		beryllium														neon																		
	0.534		1.850														0.9002																		
3	Na	12	Mg													18	Ar																		
	sodium		magnesium														argon																		
	0.968		1.738														1.784																		
4	K	20	Ca	22	Sc	24	Ti	26	V	28	Cr	30	Mn	32	Fe	34	Co	36	Ni	38	Cu	40	Zn	42	Ga	44	Ge	46	As	48	Se	50	Br	52	Kr
	potassium		calcium		scandium		titanium		vanadium		chromium		manganese		iron		cobalt		nickel		copper		zinc		gallium		germanium		arsenic		selenium		bromine		krypton
	0.890		1.550		2.985		4.506		6.110		7.190		7.210		7.860		8.900		8.908		8.960		7.140		5.910		5.323		5.727		4.810		3.1028		3.749
5	Rb	38	Sr	40	Y	42	Zr	44	Nb	46	Mo	48	Tc	50	Ru	52	Rh	54	Pd	56	Ag	58	Cd	60	In	62	Sn	64	Sb	66	Te	68	I	70	Xe
	rubidium		strontium		yttrium		zirconium		niobium		molybdenum		technetium		ruthenium		rhodium		palladium		silver		cadmium		indium		tin		antimony		tellurium		iodine		xenon
	1.532		2.640		4.472		6.520		8.570		10.280		11.000		12.450		12.410		12.023		10.490		8.650		7.310		7.265		6.087		6.240		4.933		5.854

\pgfPT[d precision=0]

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3	Na sodium 0.97	Mg magnesium 1.74															18	Ar argon 1.78	
4	K potassium 0.89	Ca calcium 1.55	Sc scandium 2.99	Ti titanium 4.51	V vanadium 6.11	Cr chromium 7.15	Mn manganese 7.21	Fe iron 7.86	Co cobalt 8.90	Ni nickel 8.91	Cu copper 8.96	Zn zinc 7.14	Ga gallium 5.91	Ge germanium 5.32	As arsenic 5.73	Se selenium 4.81	Br bromine 3.10	Kr krypton 3.75	
5	Rb rubidium 4.77	Sr strontium 2.54	Y yttrium 6.53	Zr zirconium 6.53	Nb niobium 8.87	Mo molybdenum 10.26	Tc technetium 11.00	Ru ruthenium 12.45	Rh rhodium 12.41	Pd palladium 12.02	Ag silver 10.49	Cd cadmium 8.65	In indium 7.31	Sn tin 7.27	Sb antimony 6.70	Te tellurium 6.24	I iodine 4.93	Xe xenon 5.49	

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2	Li lithium 0.534	Be beryllium 1.850																	
3	Na sodium 0.968	Mg magnesium 1.738																	
4	K potassium 0.890	Ca calcium 2.985	Sc scandium 2.985	Ti titanium 4.536	V vanadium 6.110	Cr chromium 7.150	Mn manganese 7.215	Fe iron 7.860	Co cobalt 8.960	Ni nickel 8.908	Cu copper 7.140	Zn zinc 7.140	Ga gallium 5.910	Ge germanium 5.323	As arsenic 5.727	Se selenium 4.810	Br bromine 3.103	Kr krypton 3.740	
5	Rb rubidium 1.532	Sr strontium 2.640	Y yttrium 4.472	Zr zirconium 6.520	Nb niobium 8.570	Mo molybdenum 10.280	Tc technetium 11.000	Ru ruthenium 12.450	Rh rhodium 12.410	Pd palladium 12.023	Ag silver 10.490	Cd cadmium 8.650	In indium 7.310	Sn tin 7.265	Sb antimony 6.697	Te tellurium 6.240	I iodine 4.933	Xe xenon 5.850	

1										2										3										4										5										6										7										8										9										10										11										12										13										14										15										16										17										18																																																																																																																																																																																																																																																																																																																																																																																	
1 H hydrogen 0.0099										2 He helium 0.1786										3 Li lithium 0.534										4 Be beryllium 1.850										5 B boron 2.340										6 C carbon 2.267										7 N nitrogen 1.251										8 O oxygen 1.429										9 F fluorine 1.7										10 Ne neon 0.9002										11 Na sodium 0.968										12 Mg magnesium 1.738										13 Al aluminum 2.700										14 Si silicon 2.330										15 P phosphorus 1.823										16 S sulfur 1.960										17 Cl chlorine 3.2										18 Ar argon 1.784										19 K potassium 0.890										20 Ca calcium 1.550										21 Sc scandium 2.985										22 Ti titanium 4.506										23 V vanadium 6.110										24 Cr chromium 7.150										25 Mn manganese 7.215										26 Fe iron 7.860										27 Co cobalt 8.900										28 Ni nickel 8.908										29 Cu copper 8.960										30 Zn zinc 7.140										31 Ga gallium 5.910										32 Ge germanium 5.323										33 As arsenic 5.727										34 Se selenium 4.810										35 Br bromine 3.1028										36 Kr krypton 3.749										37 Rb rubidium 1.477										38 Sr strontium 2.540										39 Y yttrium 4.570										40 Zr zirconium 6.500										41 Nb niobium 8.570										42 Mo molybdenum 10.290										43 Tc technetium 11.000										44 Ru ruthenium 12.450										45 Rh rhodium 12.410										46 Pd palladium 12.023										47 Ag silver 10.499										48 Cd cadmium 8.650										49 In indium 7.310										50 Sn tin 7.265										51 Sb antimony 6.697										52 Te tellurium 6.240										53 I iodine 4.933										54 Xe xenon 5.894									
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2 CS N d										3 At astatine N d										4 Fr francium N d										5 Ra radium N d										6 Ac actinium N d										7 Th thorium N d										8 Pa protactinium N d										9 U uranium N d										10 Np neptunium N d										11 Pu plutonium N d										12 Am americium N d										13 Cm curium N d										14 Bk berkelium N d										15 Cf californium N d										16 Es einsteinium N d										17 Fm fermium N d										18 Md mendelevium N d										19 No nobelium N d										20 Lr lawrencium N d																																																																																																																																																																																																																																																																																																																																																																							

`\pgfPT[Z list={1,...,36},cell style=pgfPTIs,ls=fig+txt]`

`\pgfPT[Z list={1,...,36},cell style=pgfPTIs,ls=txt+fig]`

Is color

Sets the lattice structure text color.

default: *black*

`\pgfPT[Z list={1,...,36},cell style=pgfPTIs,ls=txt+fig,ls color=red]`

Is font

Sets the lattice structure text font.

default: *\tiny*

`\pgfPT[Z list={1,...,36},cell style=pgfPTIs,ls=txt+fig,ls font=\tiny\bfseries]`

Is aligndefault: *right*Sets the alignment of the lattice structure to *left* or *center* or *right*.`\pgfPT[Z list={1,...,36},cell style=pgfPTIs,Is align=center]`

Periodic table showing the effect of `Is align=center`. The table is centered, and the lattice structure constants are displayed in the center of each cell. The legend shows the default alignment is right.

Is unitdefault: *pm*Sets the unit for the lattice structure constants: a, b and c. The two possible values to this key are *pm* (picometers) and *A* (Å – angstroms).

```
\pgfPTbuilcellstyle{mys}{6,3}% 6 rows by 3 columns
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-2.5;Is),(5;2.5-3;Isa),
(6;1-2.5;Isb),(6;2.5-3;Isca)]
\pgfPTstyle[Z list={1,...,36},cell style=mys,show title=false,Is align=center]
\pgfPT
```

Periodic table showing the effect of `Is unit=A`. The table is centered, and the lattice structure constants are displayed in the center of each cell. The legend shows the default unit is pm.

`\pgfPT[Is unit=A]`

Periodic table showing the effect of `Is unit=A`. The table is centered, and the lattice structure constants are displayed in the center of each cell. The legend shows the default unit is pm.

Is precisiondefault: *-1*Sets the lattice structure constants - a, b, and c - precision, as also the lattice c/a ratio, *i.e.*, the decimal places displayed in their value, performing the respective rounding, without zero padding the value.**NOTE:**

Rounding is performed over the constants data or c/a ratio values which actually have a maximum of 2 or 4 decimal places, when the values are in picometers or in angstroms, respectively. So giving this key a value of -1 (the value of the constants or c/a ratio as-is) or 2 or 4 has the same effect.

Therefore the values provided to this key should be any integer between -1 and 1 (pm) or 3 (Å). Any other integer provided will be processed as -1.

```
\pgfPTbuilcellstyle{mysls}(6,3)% 6 rows by 3 columns
[(1;1-2;Z),(1;2-3;ls),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-2.5;lsa),
(5;2.5-3;lsb),(6;1-2.5;lsc),(6;2.5-3;lsc)]
\pgfPTstyle[Z list={1,...,36},cell={w=36pt,h=42pt,style=mysls}]
\pgfPT
```

Periodic Table of Elements

Periodic Table of Elements (precision=0). The table displays elements from Hydrogen (H) to Krypton (Kr) in a standard layout. Each element cell contains its atomic number, symbol, and name. The table is color-coded by groups. A legend on the right lists crystal structures: body centered cubic, base centered orthorhombic, body centered tetragonal, diamond, face centered cubic, face centered orthorhombic, hexagonal close packed, hexagonal, monoclinic, orthorhombic, simple cubic, simple tetragonal, and tetragonal. A detailed cell style diagram on the left shows the layout of a single cell with fields for atomic number (Z), name (N), lattice structure (ls), and various constants (a, b, c, ratio).

```
\pgfPT[ls precision=0]
```

Periodic Table of Elements

Periodic Table of Elements (precision=1). The table displays elements from Hydrogen (H) to Krypton (Kr) in a standard layout. Each element cell contains its atomic number, symbol, and name. The table is color-coded by groups. A legend on the right lists crystal structures: body centered cubic, base centered orthorhombic, body centered tetragonal, diamond, face centered cubic, face centered orthorhombic, hexagonal close packed, hexagonal, monoclinic, orthorhombic, simple cubic, simple tetragonal, and tetragonal. A detailed cell style diagram on the left shows the layout of a single cell with fields for atomic number (Z), name (N), lattice structure (ls), and various constants (a, b, c, ratio).

```
\pgfPT[ls precision=1]
```

Periodic Table of Elements

Periodic Table of Elements (precision=2). The table displays elements from Hydrogen (H) to Krypton (Kr) in a standard layout. Each element cell contains its atomic number, symbol, and name. The table is color-coded by groups. A legend on the right lists crystal structures: body centered cubic, base centered orthorhombic, body centered tetragonal, diamond, face centered cubic, face centered orthorhombic, hexagonal close packed, hexagonal, monoclinic, orthorhombic, simple cubic, simple tetragonal, and tetragonal. A detailed cell style diagram on the left shows the layout of a single cell with fields for atomic number (Z), name (N), lattice structure (ls), and various constants (a, b, c, ratio).

```
\pgfPT[ls precision=2]
```

Periodic Table of Elements

Periodic Table of Elements (precision=2). The table displays elements from Hydrogen (H) to Krypton (Kr) in a standard layout. Each element cell contains its atomic number, symbol, and name. The table is color-coded by groups. A legend on the right lists crystal structures: body centered cubic, base centered orthorhombic, body centered tetragonal, diamond, face centered cubic, face centered orthorhombic, hexagonal close packed, hexagonal, monoclinic, orthorhombic, simple cubic, simple tetragonal, and tetragonal. A detailed cell style diagram on the left shows the layout of a single cell with fields for atomic number (Z), name (N), lattice structure (ls), and various constants (a, b, c, ratio).

DiscY fontdefault: `\tiny\bfseries`

Sets the discovery year font.

```
\pgfPT[Z list={1,...,36},cell style=pgfPTdisc,DiscY
font=\fontfamily{pbk}\selectfont\tiny\bfseries]
```

Periodic Table of Elements

The periodic table displays elements from Hydrogen (H) to Krypton (Kr). Each element cell contains its symbol, atomic number, name, and discovery year. The table is color-coded by groups. A legend on the right lists element categories: Alkali Metal, Alkaline Earth Metal, Transition Metal, Lanthanide, Actinide, Halogen, Noble Gas, and others. A detailed legend on the left explains the symbols used in the table: Z (Atomic Number), Ra (Radioactive), CS (Chemical Symbol), N (Name), cd (Country of Discovery), and yd (Year of Discovery).

DiscY BC scaledefault: `1`

Sets the font factor scaling for the Before Christ (BC) acronym in the discovery year.

```
\pgfPT[Z list={1,...,36},cell style=pgfPTdisc,DiscY BC scale=.8]
```

Periodic Table of Elements

This periodic table is identical to the one above, but it uses a smaller font for the discovery year (BC scale = 0.8). The layout, including the legends and element information, remains the same.

→ The electron distribution

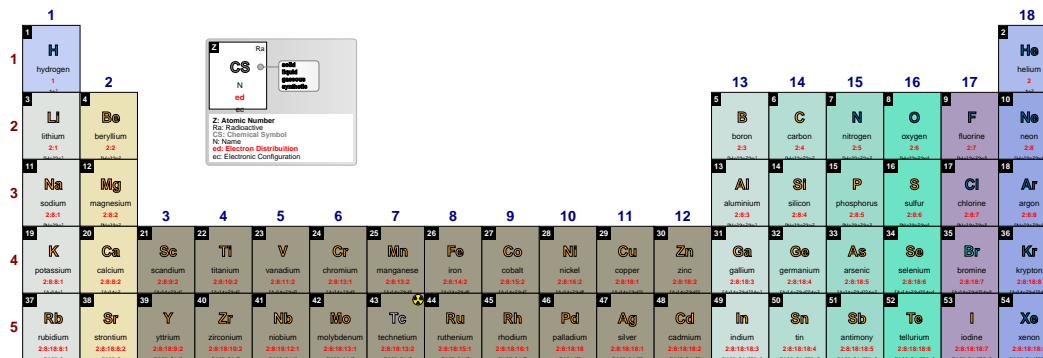
```
\pgfPTbuilcellstyle{electron}{6,3}% 6 rows by 3 columns
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),
(5;1-3;eDist),(6;1-3;eConfignl)]
```

eDist colordefault: `black`

Sets the electron distribution color.

```
\pgfPT[Z list={1,...,54},cell style=electron,eDist color=red]
```

Periodic Table of Elements



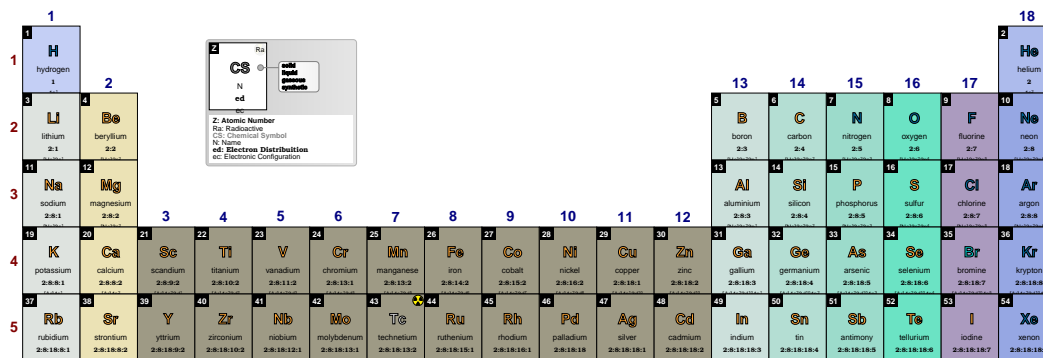
The image shows a periodic table of elements from 1 to 54, with the electron distribution font set to `\tiny\bfseries`. The elements are arranged in their standard periodic table layout. A legend box is present in the upper left, showing the format for element information: Atomic Number (Z), Radioactive (Ra), Chemical Symbol (CS), Name (N), and Electron Distribution (ed). The electron distribution is shown in red text, e.g., `1s^2 2s^2 2p^6 3s^2 3p^4` for Nitrogen (N).

eDist fontdefault: `\tiny\bfseries`

Sets the electron distribution font.

```
\pgfPT[Z list={1,...,54},cell style=electron,eDist  
font=\fontfamily{pbk}\selectfont\tiny\bfseries]
```

Periodic Table of Elements

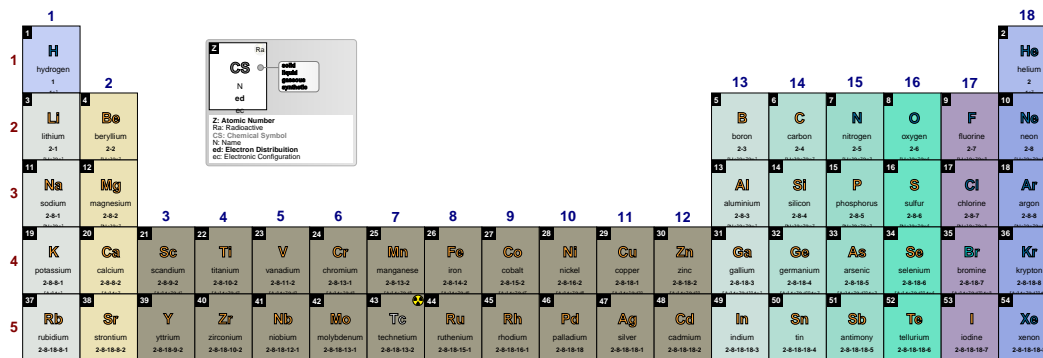


The image shows a periodic table of elements from 1 to 54, with the electron distribution font set to `\fontfamily{pbk}\selectfont\tiny\bfseries`. The elements are arranged in their standard periodic table layout. A legend box is present in the upper left, showing the format for element information: Atomic Number (Z), Radioactive (Ra), Chemical Symbol (CS), Name (N), and Electron Distribution (ed). The electron distribution is shown in red text, e.g., `1s^2 2s^2 2p^6 3s^2 3p^4` for Nitrogen (N).

eDist sepdefault: `,`Sets the separator character between energy levels in electron distribution. *If the separator character is a comma it must be provided between curly braces – {,}.*

```
\pgfPT[Z list={1,...,54},cell style=electron,eDist sep=-]
```

Periodic Table of Elements



The image shows a periodic table of elements from 1 to 54, with the electron distribution separator set to a hyphen (`-`). The elements are arranged in their standard periodic table layout. A legend box is present in the upper left, showing the format for element information: Atomic Number (Z), Radioactive (Ra), Chemical Symbol (CS), Name (N), and Electron Distribution (ed). The electron distribution is shown in red text, e.g., `1s^2-2s^2-2p^6-3s^2-3p^4` for Nitrogen (N).

```
\pgfPT[Z list={1,...,54},cell style=electron,eDist sep={,}]
```

Periodic Table of Elements

1	2											13	14	15	16	17	18		
1 H hydrogen 1												3 B boron 2,3	4 C carbon 2,4	5 N nitrogen 2,5	6 O oxygen 2,6	7 F fluorine 2,7	8 Ne neon 2,8		
3 Li lithium 2,1	4 Be beryllium 2,2											13 Al aluminum 2,8,3	14 Si silicon 2,8,4	15 P phosphorus 2,8,5	16 S sulfur 2,8,6	17 Cl chlorine 2,8,7	18 Ar argon 2,8,8		
11 Na sodium 2,8,1	12 Mg magnesium 2,8,2	19 K potassium 2,8,8,1	20 Ca calcium 2,8,8,2	21 Sc scandium 2,8,9,2	22 Ti titanium 2,8,9,2	23 V vanadium 2,8,9,2	24 Cr chromium 2,8,13,1	25 Mn manganese 2,8,13,2	26 Fe iron 2,8,14,2	27 Co cobalt 2,8,15,2	28 Ni nickel 2,8,16,2	29 Cu copper 2,8,16,1	30 Zn zinc 2,8,16,2	31 Ga gallium 2,8,16,3	32 Ge germanium 2,8,16,4	33 As arsenic 2,8,16,5	34 Se selenium 2,8,16,6	35 Br bromine 2,8,16,7	36 Kr krypton 2,8,16,8
37 Rb rubidium 2,8,18,1	38 Sr strontium 2,8,18,2	39 Y yttrium 2,8,18,9,2	40 Zr zirconium 2,8,18,9,2	41 Nb niobium 2,8,18,10,1	42 Mo molybdenum 2,8,18,13,1	43 Tc technetium 2,8,18,13,2	44 Ru ruthenium 2,8,18,15,1	45 Rh rhodium 2,8,18,16,1	46 Pd palladium 2,8,18,16	47 Ag silver 2,8,18,16,1	48 Cd cadmium 2,8,18,16,2	49 In indium 2,8,18,18,3	50 Sn tin 2,8,18,18,4	51 Sb antimony 2,8,18,18,5	52 Te tellurium 2,8,18,18,6	53 I iodine 2,8,18,18,7	54 Xe xenon 2,8,18,18,8		

→ The other contents

For all the *other contents* available for the cells of the periodic table, two keys can be set: **<content name> color** and **<content name> font**.

The <content name>'s list:

- ✓ **R**: atomic radius
- ✓ **Rcov**: covalente radius
- ✓ **Rion**: ionic radius
- ✓ **Ei**: first ionization energy
- ✓ **eneg**: electronegativity (Pauling)
- ✓ **eaff**: electroaffnity
- ✓ **O**: oxidation states
- ✓ **Tmelt**: melting point (Kelvin)
- ✓ **TmeltC**: melting point (Celsius degrees)
- ✓ **Tboil**: boiling point (Kelvin)
- ✓ **TboilC**: boiling point (Celsius degrees)
- ✓ **eConfig**: electronic configuration (increasing n)
- ✓ **eConfignl**: electronic configuration (increasing n+ℓ)
- ✓ **Cp**: specific heat capacity
- ✓ **kT**: thermal conductivity
- ✓ **Isa**: lattice constant – a
- ✓ **Isb**: lattice constant – b
- ✓ **Iscl**: lattice constant – c
- ✓ **Isca**: lattice c/a ratio
- ✓ **DiscC**: discover country
- ✓ **spectra**: visible range spectral lines

<content name> color

default: *black*

Sets the <content name> color.

```
\pgfPT[Z list={1,...,36},name color=blue]
```

Periodic Table of Elements

1	2											13	14	15	16	17	18		
1 H hydrogen 1 470 470 340 072												3 B boron 505.66	4 C carbon 246.12 670.79 2.73	5 N nitrogen 386.1 386.1 626.5 1.62	6 O oxygen 540.3 342.9 508.6 0.84	7 F fluorine 550 328 728 1.32	8 Ne neon 442.9		
3 Li lithium 350.93	4 Be beryllium 228.56 356.32 1.57											13 Al aluminum 404.95	14 Si silicon 543.995	15 P phosphorus 114.5 550.3 1126.1 0.98	16 S sulfur 104.6 1236.6 2448.6 2.34	17 Cl chlorine 622.35 445.01 817.85 1.31	18 Ar argon 39.948		
11 Na sodium 429.06	12 Mg magnesium 200.94 521.05 1.62	19 K potassium 532.8	20 Ca calcium 558.84	21 Sc scandium 39.09 527.33 1.59	22 Ti titanium 250.03 520.31 1.58	23 V vanadium 250.03 520.31 1.58	24 Cr chromium 250.03 520.31 1.58	25 Mn manganese 250.03 520.31 1.58	26 Fe iron 250.03 520.31 1.58	27 Co cobalt 250.03 520.31 1.58	28 Ni nickel 250.03 520.31 1.58	29 Cu copper 250.03 520.31 1.58	30 Zn zinc 250.03 520.31 1.58	31 Ga gallium 452.58 765.7 1.69	32 Ge germanium 452.58 765.7 1.69	33 As arsenic 452.58 765.7 1.69	34 Se selenium 452.58 765.7 1.69	35 Br bromine 452.58 765.7 1.69	36 Kr krypton 452.58 765.7 1.69

<content name> fontdefault: `\tiny\bfseries`

Sets the <content name> font.

`\pgfPT[Z list={1,...,36},name font=\tiny\itshape]`

Periodic Table of Elements

Periodic Table of Elements showing standard font settings. The table includes element symbols, atomic numbers, and names. It features a legend for crystal structures and a detailed box for the first element, Hydrogen (H), showing its atomic number, name, chemical symbol, and various physical and chemical properties.

cell fontdefault: `\bfseries\tiny`

Style to set the font for all cell contents, except for the Z and Chemical Symbol fonts.

`\pgfPT[Z list={1,...,36},cell font=\tiny\itshape]`

Periodic Table of Elements

Periodic Table of Elements showing italicized cell font settings. The table includes element symbols, atomic numbers, and names. It features a legend for crystal structures and a detailed box for the first element, Hydrogen (H), showing its atomic number, name, chemical symbol, and various physical and chemical properties.

cell colordefault: *black*

Style to set the color for all cell contents, except for the Z and Chemical Symbol colors.

`\pgfPT[Z list={1,...,36},cell color=blue]`

Periodic Table of Elements

Periodic Table of Elements showing blue cell color settings. The table includes element symbols, atomic numbers, and names. It features a legend for crystal structures and a detailed box for the first element, Hydrogen (H), showing its atomic number, name, chemical symbol, and various physical and chemical properties.

The precision of the *other contents*, which have numerical values, can also be set by a key. *Atomic radius, covalent radius, and ionic radius all have integer values, so precision does not apply to them.*

E precision

default: -1

Sets the first ionization energy and the electroaffnity precision, *i.e.*, the decimal places displayed in their value, performing the respective rounding, without zero padding the value.

NOTE:

Rounding is performed over energy values witch actually have a maximum of 3 decimal places. So giving this key a value of -1 (the value of the energy as-is) or 3 has the same effect. Therefore the values provided to this key should be any integer between -1 and 2, *i.e.*, -1, 0, 1 or 2. Any other integer provided will be processed as -1.

```
\pgfPTbuilcellstyle{myE}{5,3}% 5 rows by 3 columns
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-2.5;Ei), (5;2.5-3;eaff)]
\pgfPTstyle[Z list={1,...,54},cell style=myE,show title=false]
\pgfPT
```

\pgfPT[E precision=0]

\pgfPT[E precision=1]

\pgfPT[E precision=2]

\pgfPT[E precision=3]

T precision

default: -1

Sets the melting point and boiling point precision, *i.e.*, the decimal places displayed in their value, performing the respective rounding, without zero padding the value.

NOTE:

Rounding is performed over melting or boiling point values which actually have a maximum, respectively, of 4 or 2 decimal places. So giving this key a value of -1 (the value of the melting or boiling point as-is) or, respectively, 4 or 2 has the same effect.

Therefore the values provided to this key should be any integer between -1 and 3 or 2. Any other integer provided will be processed as -1.

\pgfPTbuilcellstyle{myT}(6,3)% 6 rows by 3 columns

[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-2.5;Tmelt),
(5;2.5-3;Tboil),(6;1-2.5;TmeltC),(6;2.5-3;TboilC)]

\pgfPTstyle[Z list={1,...,36},cell style=myT,Tmelt color=blue!50!black,TmeltC
color=blue,Tboil color=red!50!black,TboilC color=red,show title=false]

\pgfPT

default: -1

NOTE:

Therefore the values provided to this key should be any integer between -1 and 2. Any other integer provided will be processed as -1.

```
\pgfPTbuilcellstyle{myCp}{5,3}% 5 rows by 3 columns
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-3;Cp)]
\pgfPTstyle[Z list={1,...,36},cell style=myCp]
\pgfPT
```

1																	18	
1	1 H hydrogen 1.008																	2 He helium 4.003
2	3 Li lithium 6.941	4 Be beryllium 9.012															10 Ne neon 20.180	
3	11 Na sodium 22.990	12 Mg magnesium 24.305															18 Ar argon 39.948	
4	19 K potassium 39.098	20 Ca calcium 40.078	21 Sc scandium 44.956	22 Ti titanium 47.88	23 V vanadium 50.942	24 Cr chromium 52.00	25 Mn manganese 54.938	26 Fe iron 55.845	27 Co cobalt 58.933	28 Ni nickel 58.69	29 Cu copper 63.546	30 Zn zinc 65.38	31 Ga gallium 69.723	32 Ge germanium 72.64	33 As arsenic 74.922	34 Se selenium 78.96	35 Br bromine 79.904	36 Kr krypton 83.80

`\pgfPT[Cp precision=0]`

1																	18			
1	1 H hydrogen 1																	2	2 He helium 2	
2	3 Li lithium 3	4 Be beryllium 4																	10	10 Ne neon 10
3	11 Na sodium 11	12 Mg magnesium 12																	18	18 Ar argon 18
4	19 K potassium 19	20 Ca calcium 20	21 Sc scandium 21	22 Ti titanium 22	23 V vanadium 23	24 Cr chromium 24	25 Mn manganese 25	26 Fe iron 26	27 Co cobalt 27	28 Ni nickel 28	29 Cu copper 29	30 Zn zinc 30	31 Ga gallium 31	32 Ge germanium 32	33 As arsenic 33	34 Se selenium 34	35 Br bromine 35	36 Kr krypton 36		

`\pgfPT[Cp precision=1]`

1																	18																		
1	H hydrogen 26.9																	2	He helium 26.8																
3	Li lithium 24.9	4	Be beryllium 16.4													9	B boron 11.4	10	C carbon 8.5	11	N nitrogen 29.1	12	O oxygen 29.4	13	F fluorine 31.3	14	Ne neon 29.8								
5	Na sodium 28.2	6	Mg magnesium 24.9													15	Al aluminum 34.2	16	Si silicon 19.8	17	P phosphorus 23.8	18	S sulfur 22.8	19	Cl chlorine 34.6	20	Ar argon 20.8								
19	K potassium 39.1	20	Ca calcium 39.9	21	Sc scandium 44.9	22	Ti titanium 47.9	23	V vanadium 50.9	24	Cr chromium 52.0	25	Mn manganese 54.9	26	Fe iron 55.8	27	Co cobalt 58.9	28	Ni nickel 58.7	29	Cu copper 63.5	30	Zn zinc 65.4	31	Ga gallium 70.6	32	Ge germanium 72.6	33	As arsenic 74.9	34	Se selenium 78.9	35	Br bromine 79.9	36	Kr krypton 83.8

The figure displays a periodic table of elements. A callout box for Carbon (C) provides the following data:

- Z: Atomic Number**: 6
- Ra: Atomic Weight**: 12.011
- CS: Chemical Symbol**: C
- IC: Name**: Carbon
- kT: Thermal Conductivity (Wm⁻¹K⁻¹)**: 1.0

The image displays a periodic table of elements. A callout box for Carbon (C) provides the following information:

- Symbol:** C
- Atomic Number (Z):** 6
- Radioactive (Ra):** No
- Chemical Symbol (CS):** C
- Name (N):** Carbon
- Thermal Conductivity (Wm⁻¹K⁻¹):** 1.7

The periodic table includes elements from Hydrogen (H) to Krypton (Kr), with their respective atomic numbers and names. The callout box highlights the properties of Carbon, which is a non-metal and a solid at room temperature.

The figure displays a periodic table of elements. A callout box for Cesium (Cs) provides the following data:

- Z: Atomic Number** 55
- Ra: Radioactive**
- CS: Chemical Symbol**
- N: Name** Cesium
- kT: Thermal Conductivity (W/m³K¹)** 0.33

The periodic table shows elements from Hydrogen (1) to Krypton (36). The elements are arranged in rows and columns, with their atomic numbers and names displayed. The callout box for Cesium (Cs) is located in the bottom right corner of the table.

1
H
hydrogen
0.181

2
Li
lithium
6.94

3
Na
sodium
22.99

4
K
potassium
39.10

5
Be
beryllium
9.01

6
Mg
magnesium
24.31

7
Ca
calcium
40.08

8
Sc
scandium
44.96

9
Ti
titanium
47.88

10
V
vanadium
50.94

11
Cr
chromium
52.00

12
Mn
manganese
54.94

13
Fe
iron
55.85

14
Co
cobalt
58.93

15
Ni
nickel
58.69

16
Cu
copper
63.55

17
Zn
zinc
65.38

18
Ga
gallium
69.72

19
Ge
germanium
72.64

20
As
arsenic
74.92

21
Se
selenium
78.96

22
Br
bromine
79.90

23
Kr
krypton
83.80

24
B
boron
10.81

25
C
carbon
12.01

26
N
nitrogen
14.01

27
O
oxygen
16.00

28
F
fluorine
18.99

29
Ne
neon
20.18

30
Al
aluminum
26.98

31
Si
silicon
28.09

32
P
phosphorus
30.97

33
S
sulfur
32.07

34
Cl
chlorine
35.45

35
Ar
argon
39.95

36
Br
bromine
79.90

37
Kr
krypton
83.80

38
Xe
xenon
131.29

39
Ra
radioactive
226

40
Ac
actinide
227

41
Th
thorium
232

42
Pa
protactinium
231

43
U
uranium
238

44
Np
neptunium
237

45
Pu
plutonium
244

46
Am
americium
243

47
Cm
curium
247

48
Bk
berkelium
247

49
Cf
californium
251

50
Es
einsteinium
252

51
Fm
fermium
257

52
Md
mendelevium
258

53
No
nobelium
259

54
Lr
lawrencium
260

55
La
lanthanum
138.91

56
Ce
cerium
140.12

57
Pr
praseodymium
140.91

58
Nd
neodymium
144.24

59
Pm
promethium
145

60
Sm
samarium
150.36

61
Eu
europium
151.96

62
Gd
gadolinium
157.25

63
Tb
terbium
158.93

64
Dy
dysprosium
162.50

65
Ho
holmium
164.93

66
Er
erbium
167.26

67
Tm
thulium
168.93

68
Yb
ytterbium
173.05

69
Lu
lutetium
174.97

70
Hf
hafnium
178.49

71
Ta
tantalum
180.95

72
W
tungsten
183.84

73
Re
rhenium
186.21

74
Os
osmium
190.23

75
Ir
iridium
192.22

76
Pt
platinum
195.08

77
Au
gold
196.97

78
Hg
mercury
200.59

79
Tl
thallium
204.38

80
Pb
lead
207.2

81
Bi
bismuth
208.98

82
Po
polonium
209

83
At
astatine
210

84
Rn
radon
222

85
Fr
francium
223

86
Ra
radium
226

87
Ac
actinide
227

88
Th
thorium
232

89
Pa
protactinium
231

90
U
uranium
238

91
Np
neptunium
237

92
Pu
plutonium
244

93
Am
americium
243

94
Cm
curium
247

95
Bk
berkelium
247

96
Cf
californium
251

97
Es
einsteinium
252

98
Fm
fermium
257

99
Md
mendelevium
258

100
No
nobelium
259

101
Lr
lawrencium
260

102
Uu
ununoctium
289

103
Uuh
unbihydrogen
294

104
Uuq
unbiquadium
298

105
Uub
unbium
304

106
Uubh
unbihassium
310

107
Uuhc
unbihassium
315

108
Uuhf
unbihassium
321

109
Uuhg
unbihassium
327

110
Uuhh
unbihassium
331

111
Uuhk
unbihassium
337

112
Uuhl
unbihassium
342

113
Uuhm
unbihassium
348

114
Uuhn
unbihassium
353

115
Uuhp
unbihassium
358

116
Uuhs
unbihassium
363

117
Uuhv
unbihassium
368

118
Uuht
unbihassium
373

The periodic table displays elements with their atomic numbers, symbols, names, and atomic weights. A callout box for Carbon (C) provides detailed information:

- Atomic Number (Z):** 6
- Symbol:** C
- Name:** Carbon
- Radioactive (Ra):** No
- Chemical Symbol:** C
- Thermal Conductivity (KT):** 1.76 W/m·K

The diagram shows a carbon atom with 6 protons and 6 neutrons in the nucleus, and 6 electrons in two shells (2 in the inner shell, 4 in the outer shell).

`\pgfPT[kT precision=5]`

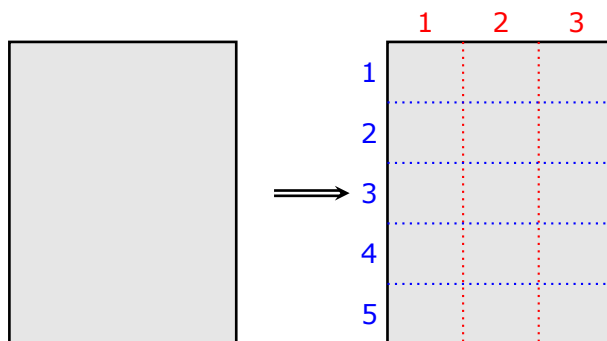
1	2	13	14	15	16	17	18
1 H hydrogen 0.18895	2 He helium 0.1513	5 B boron 27.4	6 C carbon 14.0	7 N nitrogen 0.02583	8 O oxygen 0.02458	9 F fluorine 0.0377	10 Ne neon 0.0491
3 Li lithium 6.94	4 Be beryllium 200	11 Na sodium 142	12 Mg magnesium 156	13 Al aluminum 237	14 Si silicon 149	15 P phosphorus 0.236	16 S sulfur 0.205
19 K potassium 102.5	20 Ca calcium 201	21 Sc scandium 15.8	22 Ti titanium 21.9	23 V vanadium 30.7	24 Cr chromium 93.9	25 Mn manganese 7.81	26 Fe iron 86.4
		27 Co cobalt 100	28 Ni nickel 90.9	29 Cu copper 401	30 Zn zinc 116	31 Ga gallium 40.6	32 Ge germanium 60.2
						33 As arsenic 50.2	34 Se selenium 0.519
						35 Br bromine 0.122	36 Kr krypton 0.00943

`\pgfPTresetstyle`

Designing cells with \pgfPTbuildcell

To start designing the *base cell* of the Periodic Table it is necessary to keep in mind that each cell will be split into **n** rows and **k** columns.

As a running example, 5 rows and 3 columns will be used:

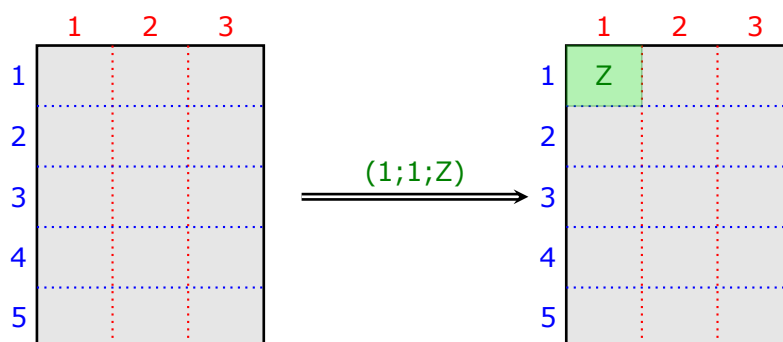


The next task is to assign contents to the cell by typing *trios* with the structure

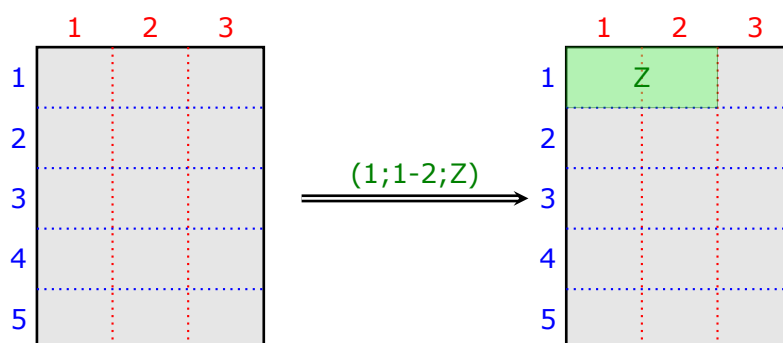
- **(row;column;content)**
- or **(start row-end row;start column-end column;content)**
- or a combination of both.

The available **contents** are: Z, name, CS, Ar, Ar*, radio, R, Rcov, Rion, Ei, eneg, eaff, O, Tmelt, TmeltC, Tboil, TboilC, eDist, eConfig, eConfignl, d, Cp, kT, ls, lsa, lsb, lsc, lsca, DiscY, DiscC and spectra.

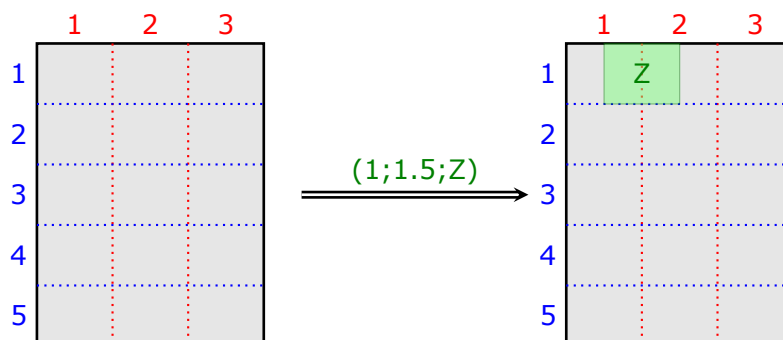
Assigning, for instance, (1;1;Z) will show the atomic number in the first row and in the first column,



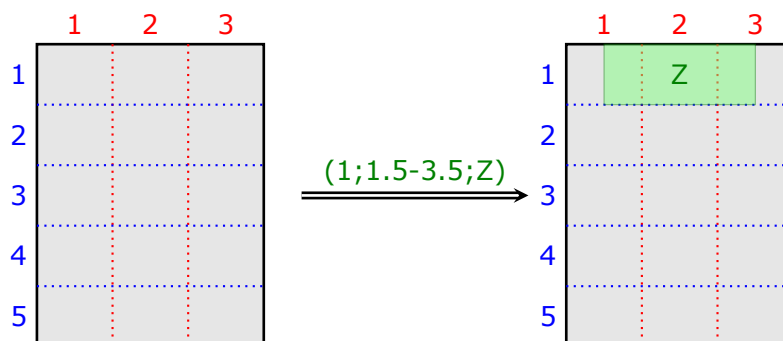
while the assignment (1;1-2;Z) will show the atomic number in the first row and filling the first and second columns,



It is also possible to start at a *fraction* of a line or column. If it is intended to start a line at the middle of the first column the value used should be **1.5**, which means that the start value is at the half (0.5) of the first column (1), observing that 1.5 is 0.5 plus 1:



As in the second example above it is possible to end up in a specified *fraction* of a line or column:



The row, column syntax

Both lines and columns share the same syntax, where **n** is any integer between 1 and the number of rows and **f** is the fractional part of any number between 0 and 1:

- (1) If only the row number **n** is provided the *content* is placed at the row **n**.
- (2) If the row number **n** is provided followed by a **dot** and a number **f**, the *content* is placed at the fraction **f** of the row **n**.
- (3) If the start row **n_s** and the end row **n_e** are provided separated by a **dash**, i.e., **n_s-n_e**, the *content* is placed filling all the rows from **n_s** to **n_e**.
The **dot** notation described in (2) can be used both on **n_s** and **n_e**.
- (4) All of the items above apply to columns in the same way.

✂ The cell contents

- ✓ **Z** – the atomic number of the elements.
- ✓ **name** – the name of the elements.
- ✓ **CS** – the chemical symbol of the elements.
- ✓ **Ar** – the relative atomic mass (atomic weight) of the elements.
- ✓ **Ar*** – the standard relative atomic mass (standard atomic weight) of the elements.

- ✓ **radio** – radioactivity of the elements. If the element is radioactive the figure ☢ is placed in the cell, otherwise nothing is shown.
- ✓ **R** – the atomic radius of the elements. The atomic radius shown is the calculated radius and is expressed in picometers.
- ✓ **Rcov** – the covalent radius of the elements. The covalent radius shown is for single bonds and is expressed in picometers.
- ✓ **Rion** – the ionic radius of the elements. The radius shown is the effective ionic radius in picometers.
- ✓ **Ei** – the first ionization energy of the elements, measured in $\text{kJ} \cdot \text{mol}^{-1}$. All data from rutherfordium onwards is predicted.
- ✓ **eneg** – the Pauling electronegativity of the elements.
- ✓ **eaff** – the electroaffinity (electron affinity) of the elements, measured in $\text{kJ} \cdot \text{mol}^{-1}$. Estimated negative values have been replaced by zero, since the negative ions formed in these cases are always unstable (they may have lifetimes of the order of microseconds to milliseconds, and invariably autodetach after some time).
- ✓ **O** – the common oxidation states of the elements.
- ✓ **Tmelt** – the melting point, in Kelvin, of the elements.
- ✓ **TmeltC** – the melting point, in degrees Celsius, of the elements.
- ✓ **Tboil** – the boiling point, in Kelvin, of the elements.
- ✓ **TboilC** – the boiling point, in degrees Celsius, of the elements.
- ✓ **eDist** – the electron distribution of the elements.
- ✓ **eConfig** – the electronic configuration, in increasing n (principal quantum number), of the element, corresponding to the *spectroscopic* order of orbital energies, that is, the reverse of the order in which electrons are removed from a given atom to form positive ions.
Note: the short version of the electronic configuration is used, i.e., [previous noble gas]remaining electrons. For example, for scandium it is: [Ar]3d¹4s²
- ✓ **eConfigl** – the electronic configuration, in increasing sum of n and ℓ (azimuthal quantum number), of the element, following the order based on the Madelung rule.
Note: the short version of the electronic configuration is used, i.e., [previous noble gas]remaining electrons. For example, for scandium it is: [Ar]4s²3d¹
- ✓ **d** – the density of the elements, in the corresponding physical state, at 25°C and 1 atm.
- ✓ **Cp** – the specific heat capacity of the elements in $\text{J} \cdot \text{mol}^{-1} \cdot \text{K}^{-1}$ at 25°C and 100 kPa.
- ✓ **kT** – the thermal conductivity of the elements in $\text{J} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$ at 25°C.
- ✓ **ls** – the lattice structure of the elements at 1 bar and mostly at 25°C.
- ✓ **lsa** – the lattice constant a of the elements in picometers at 1 bar and mostly at 25°C.
- ✓ **lsb** – the lattice constant b of the eligible elements in picometers at 1 bar and mostly at 25°C.
- ✓ **lsc** – the lattice constant c of the eligible elements in picometers at 1 bar and mostly at 25°C.
- ✓ **lsca** – the lattice c/a ratio of the eligible elements at 1 bar and mostly at 25°C.
- ✓ **DiscY** – the discovery year of the elements.
- ✓ **DiscC** – the discovery country or in, a few cases, region (Middle East or Asia Minor) of the elements.
- ✓ **spectra** – the emission spectrum of the elements. The spectrum is only shown if available. The spectra are pre-built using the package `pgf-spectra` via the commands:

```
\pgfspectraStyle[back=visible40,line width=1pt,width=180pt,height=45pt,%
    relative intensity,relative intensity threshold=.375,%
    brightness=.5,charge=all,Imin=.125,gamma=1]
\foreach \SQ in {H,He,...,Bi,Po,Rn,Fr,...,Es}% Z=1,2,...,83,84,86,87,...,99
{
    \pgfspectra[element=\SQ]%
}
```

✧ Built-in cell styles

There is a set of *built-in* cell styles that could be used for the described purposes:

- ✓ **pgfPT2lang** – a cell layout to use with the name in two languages.

Built-in style **pgfPT2lang**

The build command:

```
\pgfPTbuildcell(6,3)%
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4-5;1-3;name),(6;1-3;Ar)]
```

	1	2	3
1	Z		radio
2			
3		CS	
4			
5		name	
6		Ar	

scale 1.6:1

- ✓ **pgfPT3lang** – a cell layout to use with the name in three languages.

Built-in style **pgfPT3lang**

The build command:

```
\pgfPTbuildcell(7,3)%
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4-6;1-3;name),(7;1-3;Ar)]
```

	1	2	3
1	Z		radio
2			
3		CS	
4			
5		name	
6			
7		Ar	

scale 1.6:1

- ✓ **pgfPTR** – a cell layout to display the atomic radius and its periodic variations (if of course the **show periodic variations** key is set to true).

Built-in style **pgfPTR**

The build command:

```
\pgfPTbuildcell(5,3)%
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-3;R)]
```

	1	2	3
1	Z		radio
2			
3		CS	
4		name	
5		R	

scale 1.6:1

- ✓ **pgfPTEi** – a cell layout to display the first ionization energy and its periodic variations (if of course the **show periodic variations** key is set to true).

Built-in style **pgfPTEi**

The build command:

```
\pgfPTbuildcell(5,3)%
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-3;Ei)]
```

	1	2	3
1	Z		radio
2		CS	
3			
4	name		
5	Ei		

scale 1.6:1

- ✓ **pgfPTeaff** – a cell layout to display the electron affinity and its periodic variations (if of course the **show periodic variations** key is set to true).

Built-in style **pgfPTeaff**

The build command:

```
\pgfPTbuildcell(5,3)%
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-3;eaff)]
```

	1	2	3
1	Z		radio
2		CS	
3			
4	name		
5	eaff		

scale 1.6:1

- ✓ **pgfPTREi** – a cell layout to display the atomic radius and first ionization energy and their periodic variations (if of course the **show periodic variations** key is set to true).

Built-in style **pgfPTREi**

The build command:

```
\pgfPTbuildcell(6,3)%
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-3;R),(6;1-3;Ei)]
```

	1	2	3
1	Z		radio
2		CS	
3			
4	name		
5	R		
6	Ei		

scale 1.6:1

- ✓ **pgfPTIs** – a cell layout to display the lattice system.

Built-in style **pgfPTIs**

The build command:

```
\pgfPTbuildcell(5,3)%
[(1;1-2.5;Z),(1;2.5-3;Is),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-3;Ar)]
```

	1	2	3
1	Z		Is
2		CS	
3			
4	name		
5	Ar		

scale 1.6:1

✓ **pgfPTdisc** – a cell layout to display the discovery country and discovery year.

Built-in style **pgfPTdisc**

The build command:

```
\pgfPTbuildcell(6,3)%  
[(1;1-2;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4;1-3;name),(5;1-3;DiscC),(6;1-3;DiscY)]
```

	1	2	3
1	Z		radio
2			
3		CS	
4	name		
5	DiscC		
6	DiscY		

scale 1.6:1

Designing color schemes

There are two ways to make a new color scheme:

- with the command `\pgfPTnewColorScheme`
- and using the *script* in the file [pgfPTcolorSchemes.html](#)

✠ Designing a color scheme with \pgfTnewColorScheme

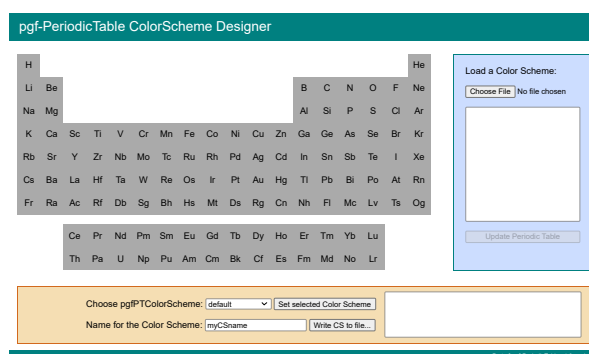
This command provides a way to set the cell background color of each of the 118 elements of the Periodic Table. *If the intention is to set the background color for all of them, it is highly recommended to use the file `pgfPTcolorSchemes.html`, unless the trailing color begin at a small atomic number.*

Despite that, this command can always be used taking into account:

1. It has the form `\pgfPTnewColorScheme[trailing color]{name}{color list}` where:
 - the first argument (enclosed by square brackets) is optional. If provided, the specified trailing color will be used, otherwise the default color (white) will be used as trailing color.
 - the second and third arguments are mandatory and specify, respectively, the color scheme name and the color list.
2. The **name** is any name made up of letters (only the characters a,...,z and A,...,Z).
3. The **color list** is a comma-separated list where each entry has the format `r/g/b`, representing the red, blue and green values, between 0 and 1, of the color: the first entry of the list will be the background color used in the cell of the element with atomic number 1, the second entry, the background color of the cell of the element with atomic number 2, and so on.

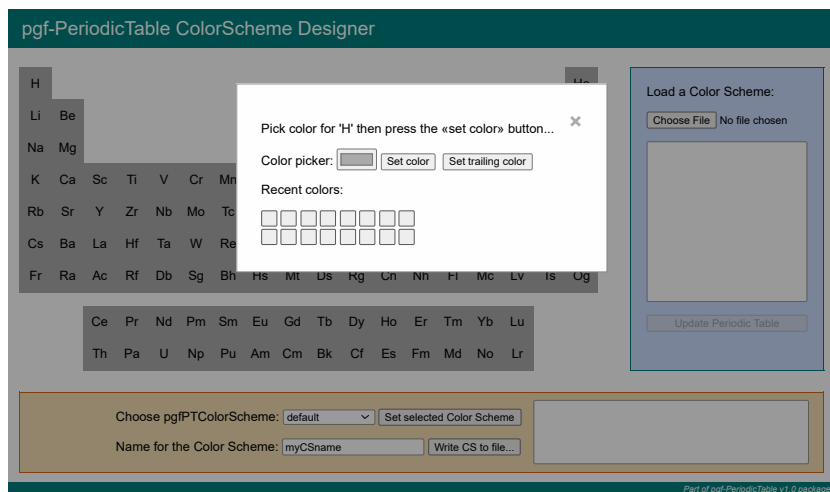
If the color list has ten entries, these entries will set the background colors of the elements with atomic numbers from 1 to 10. For the following atomic numbers, greater than or equal to 11, the **trailing color** will be used in the color background.


✠ Designing a color scheme with pgfPTcolorSchemes.html

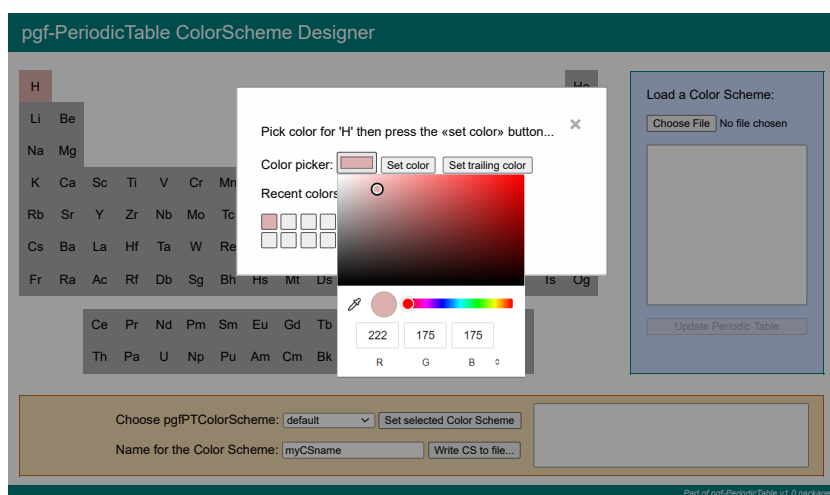


The [pgfPTcolorSchemes.html](#) *designer* is an *html* file with a little *javascript* code to perform the task of building a color scheme to use with the `back color scheme` key associated with the `\pgfPT` command.

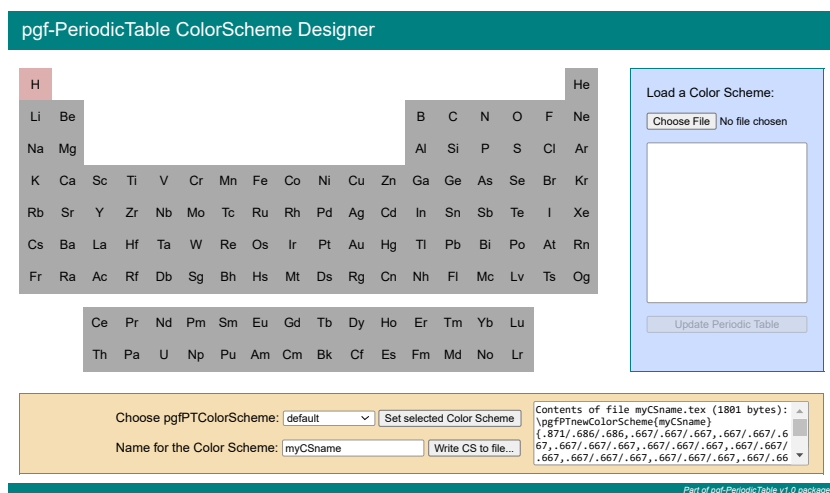
The Periodic Table of the Elements is displayed on the page and clicking on an element opens a color dialog:



Clicking on the Color picker:  button opens a color dialog, where there is the possibility to choose the desired color or manually enter one color using one of the three models available (RGB, HSL or HEX):



After changing the desired colors it is possible to save the color scheme in a file by clicking on **Write CS to file...**:

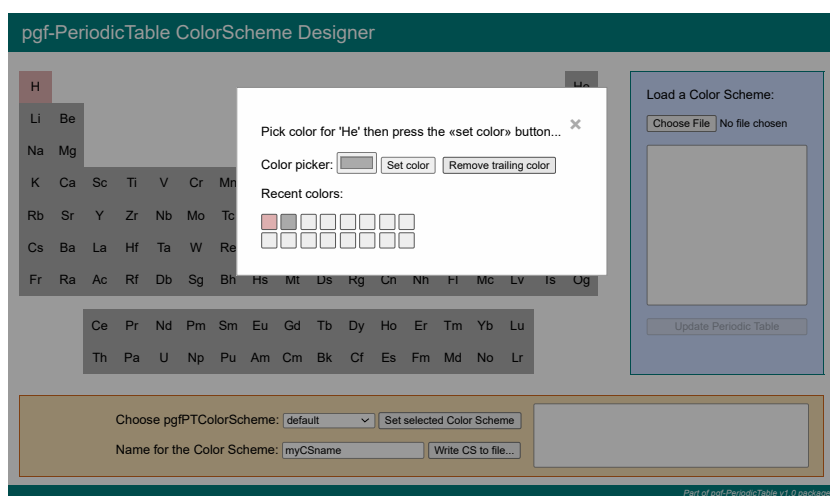


To use a color scheme saved in a file there are two possible ways:

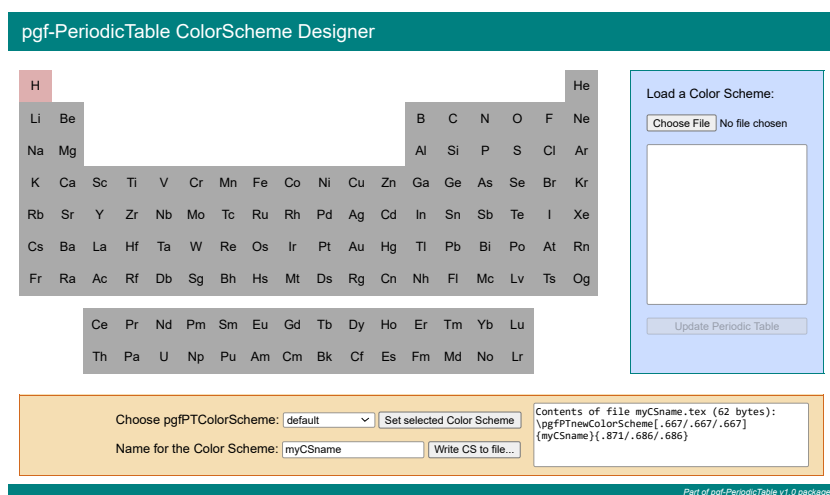
- loading the file in the working document via the `\input` \LaTeX command, for instance, `\input{myCSname.tex}`.
- or by opening the file and copying and pasting its contents into the working document.

In either case, the operation can be performed at any location in the document, but before the named color scheme is used.

Note that in the previous example there is only one color that has been defined (for hydrogen). In that case, it is useful to set the trailing color in helium by clicking in **Set trailing color** (which automatically changes to **Remove trailing color**). After that only the hydrogen and helium are clickable, all the other elements are locked to click:



Then the saved color scheme will have the optional trailing color and the size will be smaller as only the color codes of the changed elements are stored:



To remove the trailing color click on the last enabled element (in the above case helium) and then click on **Remove trailing color**. After that, all elements can be clicked again.

It is also possible to load a color scheme saved to a file by clicking on **Choose File** and then clicking on **Update Periodic Table** for the color scheme to take effect:

pgf-PeriodicTable ColorScheme Designer

Choose pgfPTColorScheme: default Set selected Color Scheme

Name for the Color Scheme: myCSname Write CS to file...

Part of pgf-PeriodicTable v1.0 package

Finally its possible to load a built-in color scheme by choosing a named *pgfPTColorScheme* in the corresponding combo box and then clicking on **Set selected Color Scheme**:

pgf-PeriodicTable ColorScheme Designer

Choose pgfPTColorScheme: Soft Set selected Color Scheme

Name for the Color Scheme: myCSname Write CS to file...

Part of pgf-PeriodicTable v1.0 package

All the operations described are always available.

A few more examples

The following examples could be used for students or for any other purposes.

```
\pgfPTbuildcell(8,3)% 8 rows by 3 columns
[(1;1.4-2.8;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4.2;1-3;name),
(5.4;1-3;Ar),(6.5;1-3;eDist),(7.55-8.95;1-2.25;DiscC),(7.55-8.95;2.25-3.8;DiscY)]
\pgfPT
```

Periodic Table of Elements

This is a detailed periodic table of elements, organized into 8 rows and 3 columns. It includes element symbols, names, atomic numbers, and various properties. The table is color-coded by groups and includes a legend for element types and discovery countries.

```
\pgfPT[eDist color=blue!70!black,Ar precision=2,DiscC
font=\fontsize{4}{4}\selectfont,DiscY font=\fontsize{4}{4}\selectfont\bfseries]
```

Periodic Table of Elements

This is a detailed periodic table of elements, organized into 8 rows and 3 columns. It includes element symbols, names, atomic numbers, and various properties. The table is color-coded by groups and includes a legend for element types and discovery countries.

```
\pgfPTbuildcell(8,3)% 8 rows by 3 columns
[(1;1-2;Z),(1;3;radio),(2-3;1-3;CS),(4;1-3;name),(5;1-2.5;Ar),(5;2.5-3;spectra),
(7;1-2.5;DiscY),(7;2.5-3;DiscC),(8;1-3;eDist)]
\pgfPT[csPS,Ar label=w,background={left color=black!20}]
```

Periodic Table of Elements

```
\pgfPTbuildcell(8,3)% 8 rows by 3 columns
[(1;1-3;Z),(1;3;radio),(2-3;1.5-3.5;CS),(4.2;1-3;name),(5.4;1-3;Ar),
(6.5;1-3;eConfigl),(7.55-8.95;1-2.45;DiscC),(7.55-8.95;2.45-3;DiscY)]
\pgfPT[eConfigl color=blue!70!black,Ar precision=2,DiscC
font=\fontsize{4}{4}\selectfont,DiscY font=\fontsize{4}{4}\selectfont\bfseries]
```

Periodic Table of Elements

Representative elements: element families



For the **representative elements** (groups **1**, **2** and **13** to **18**) it is common to speak of families that reflect their common characteristics. So we have **the families**:

GROUP **1**: **Alkali metals**

► *lithium, sodium, potassium, rubidium, cesium and francium.*

The atoms of these elements **have** only **one valence electron**.

- ✓ They react violently with water to form hydroxides.
- ✓ They have a silver-gray color, with the exception of cesium, which has a golden hue.

GROUP **2**: **Alkaline earth metals**

► *beryllium, magnesium, calcium, strontium, barium and radium.*

The atoms of these elements **have** **two valence electrons**.

- ✓ Their oxides remain solid at high temperatures and form alkaline solutions.
- ✓ They react violently with water to form hydroxides.
- ✓ When they burn, they have reddish flames, excluding barium, which presents a greenish flame.

GROUP **13**: **Boron group**

► *boron, aluminium, gallium, indium, thallium and nihonium.*

The atoms of these elements **have** **three valence electrons**.

- ✓ Boron is a metalloid and the other are metals.
- ✓ Boron, aluminium, gallium, indium and thallium are often used as p-type silicon dopants.
- ✓ Aluminium is the third most abundant element in the Earth's crust (7.4%)

GROUP **14**: **Carbon group**

► *carbon, silicon, germanium, tin, lead and flerovium.*

The atoms of these elements **have** **four valence electrons**.

- ✓ Carbon is a non-metal, silicon and germanium are metalloids, and tin and lead are metals.
- ✓ Silicon and germanium are used in semiconductors.

GROUP 15: Pnictogens

► *nitrogen, phosphorus, arsenic, antimony, bismuth and moscovium.*

The atoms of these elements **have five valence electrons**.

- ✓ Nitrogen and phosphorus are non-metals, arsenic and antimony are metalloids and bismuth is a metal.
- ✓ Phosphorus, arsenic, antimony and bismuth are often used as n-type silicon dopants.
- ✓ Diatomic nitrogen is the main constituent of the Earth's atmosphere (78%).

GROUP 16: Chalcogens

► *oxygen, sulfur, selenium, tellurium, polonium and livermorium.*

The atoms of these elements **have six valence electrons**.

- ✓ Oxygen, sulfur and selenium are non-metals, tellurium is a metalloid and polonium is a metal.
- ✓ Diatomic oxygen is the second constituent of the Earth's atmosphere (21%).

GROUP 17: Halogens

► *fluorine, chlorine, bromine, iodine, astatine and tennessine.*

The atoms of these elements **have seven valence electrons**.

- ✓ They are extremely reactive elements, as they are very electronegative.
- ✓ Fluorine is able to *attack* inert substances, including the heavier noble gas atoms.

GROUP 18: Noble gases

► *helium, neon, argon, krypton, xenon, radon and oganesson.*

The atoms of these elements have the valence shell fully filled, which corresponds to **eight valence electrons**, with the exception Helium, which has only one shell and, consequently, has **two valence electrons**.

- ✓ They are extremely inert elements, that is, they do not react with other elements, as they are the most stable elements in Nature.

EXERCISE:

In the following scheme of the Periodic Table, the positions of some chemical elements are represented by letters:

THE LETTERS DO NOT CORRESPOND TO THE CHEMICAL SYMBOLS OF THE ELEMENTS.

A																B
C	D														E	
	F														G	H
I	J					K		L					M		N	O
												P				Q
						R										S
T																

Using the letters shown:


1. identify group 2 elements of the Periodic Table.
2. identify the elements of the 2nd period of the Periodic Table.
3. identify group 17 elements of the Periodic Table.
4. identify the elements of block s.
5. identify the elements of block p.
6. identify the elements of block d.
7. identify the metallic elements.
8. identify the non-metallic elements.
9. identify the transition metals.
10. identify the alkaline earth metals.
11. identify the noble gases.
12. tell which element belongs, simultaneously, to the 4th period and to group 14.
13. identify the representative elements that tend to generate positive ions.
14. indicate an element that forms bivalent ions.
15. indicate the halogen whose mononegative ion has the largest radius.
16. write the chemical formula of the compound formed by the elements **F** and **O**.
17. identify, justifying, the element with the largest atomic radius.
18. identify, justifying, the element with the lowest 1st ionization energy.


For the source of this example please see the file pgf-PeriodicTableManual_Examples.tex

EXERCISE:

Using the following notation,

☒ for the elements in the gaseous state (NTP),

 for the elements in the liquid state (NTP) and

 for the synthetic elements,

fill in the following Periodic Table:

A 10x10 grid with a 2x2 block of cells in the top-left corner highlighted in light blue. The rest of the grid is white with black grid lines.

For the source of this example please see the file pgf-PeriodicTableManual_Examples.tex

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