

# ChemGlobe - Periodic table of elements

<http://periodictable.tsx.org>

|    |      |         |      |        |      |         |      |         |      |         |      |         |       |         |        |         |        |        |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
|----|------|---------|------|--------|------|---------|------|---------|------|---------|------|---------|-------|---------|--------|---------|--------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|-------|--------|-----|--------|-------|--------|-------|--------|---|
|    |      |         |      |        |      |         |      |         |      | 18      |      |         |       |         |        |         |        |        |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
| 1A |      |         |      |        |      |         |      |         |      | 0       |      |         |       |         |        |         |        |        |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
| 1  |      |         |      |        |      |         |      |         |      |         |      |         |       |         |        |         |        | 2      |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
| 1  | H    |         |      |        |      |         |      |         |      |         |      |         |       |         |        |         |        | He     |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
|    | 1.01 |         |      |        |      |         |      |         |      |         |      |         |       |         |        |         |        | 4.00   |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
|    | -259 | 0.09    |      |        |      |         |      |         |      |         |      |         |       |         |        |         | -269   | 0.18   |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
|    | -253 | 2.1     |      |        |      |         |      |         |      |         |      |         |       |         |        |         | -269   | -      |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
|    |      | 2A      |      |        |      |         |      |         |      |         |      |         |       |         |        |         |        |        |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
| 2  | 3    | 4       |      |        |      |         |      |         |      |         |      |         | 5     | 6       | 7      | 8       | 9      | 10     |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
| 2  | Li   | Be      |      |        |      |         |      |         |      |         |      |         | B     | C       | N      | O       | F      | Ne     |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
|    | 6.94 | 9.01    |      |        |      |         |      |         |      |         |      |         | 10.81 | 12.01   | 14.01  | 16.00   | 19.00  | 20.18  |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
|    | 181  | 0.53    | 1277 | 1.85   |      |         |      |         |      |         |      |         |       |         | (2030) | 2.35    | (3550) | 2.2    | -210 | 1.25   | -219 | 1.43   | -220 | 1.7    | -249 | 0.9    |      |        |       |        |     |        |       |        |       |        |   |
|    | 1330 | 1.0     | 2970 | 1.5    |      |         |      |         |      |         |      |         |       |         | 2550   | 2.0     | 4830   | 2.5    | -196 | 3.0    | -183 | 3.5    | -188 | 4.0    | -246 | -      |      |        |       |        |     |        |       |        |       |        |   |
|    | 11   | 22.99   | 12   | 24.31  |      |         |      |         |      |         |      |         |       |         | 13     | 26.98   | 14     | 28.09  | 15   | 30.97  | 16   | 32.06  | 17   | 35.45  | 18   | 39.95  |      |        |       |        |     |        |       |        |       |        |   |
| 3  | Na   | Mg      |      |        |      |         |      |         |      |         |      |         | Al    | Si      | P      | S       | Cl     | Ar     |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
|    | 98   | 0.97    | 650  | 1.74   |      |         |      |         |      |         |      |         |       |         | 660    | 2.70    | 1410   | 2.33   | 44   | 1.82   | 119  | 2.07   | -101 | 3.2    | -189 | 1.78   |      |        |       |        |     |        |       |        |       |        |   |
|    | 892  | 0.9     | 1107 | 1.2    |      |         |      |         |      |         |      |         |       |         | 2450   | 1.5     | 2680   | 1.8    | 280  | 2.1    | 445  | 2.5    | -35  | 3.0    | -183 | -      |      |        |       |        |     |        |       |        |       |        |   |
|    | 19   | 39.10   | 20   | 40.08  | 3A   | 4A      | 5A   | 6A      | 7A   | 8       | 8    | 10      | 11    | 12      | 31     | 69.72   | 32     | 72.59  | 33   | 74.91  | 34   | 78.96  | 35   | 79.90  | 36   | 83.80  |      |        |       |        |     |        |       |        |       |        |   |
| 4  | K    | Ca      | Sc   | Ti     | V    | Cr      | Mn   | Fe      | Co   | Ni      | Cu   | Zn      | Ga    | Ge      | As     | Se      | Br     | Kr     |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
|    | 64   | 0.86    | 838  | 1.55   | 1539 | 3.0     | 1668 | 4.54    | 1900 | 6.1     | 1875 | 7.19    | 1245  | 7.43    | 1536   | 7.86    | 1495   | 8.9    | 1453 | 8.9    | 1083 | 8.96   | 420  | 7.13   | 30   | 5.91   | 937  | 5.32   | Subl. | 5.72   | 217 | 4.79   | -7    | 3.12   | -157  | 3.7    |   |
|    | 760  | 0.8     | 1440 | 1.0    | 2730 | 1.3     | 3260 | 1.5     | 3450 | 1.5     | 2200 | 1.6     | 2097  | 1.5     | 3000   | 1.8     | 2900   | 1.9    | 2730 | 1.9    | 2595 | 1.9    | 906  | 1.6    | 2237 | 1.6    | -    | 2830   | 1.8   | -      | 2.0 | 685    | 2.4   | 58     | 2.8   | -152   | - |
|    | 37   | 85.47   | 38   | 87.62  | 39   | 88.91   | 40   | 91.22   | 41   | 91.22   | 42   | 95.94   | 43    | (98.91) | 44     | 101.07  | 45     | 102.91 | 46   | 106.42 | 47   | 107.87 | 48   | 112.41 | 49   | 114.82 | 50   | 118.69 | 51    | 121.75 | 52  | 127.60 | 53    | 126.90 | 54    | 131.29 |   |
| 5  | Rb   | Sr      | Y    | Zr     | Nb   | Mo      | Tc   | Ru      | Rh   | Pd      | Ag   | Cd      | In    | Sn      | Sb     | Te      | I      | Xe     |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
|    | 39   | 1.53    | 768  | 2.6    | 1509 | 4.47    | 1852 | 6.49    | 2468 | 8.57    | 2610 | 10.2    | 2140  | 11.5    | 2500   | 12.4    | 1966   | 12.4   | 1552 | 12.0   | 961  | 10.5   | 321  | 8.65   | 156  | 7.31   | 232  | 7.30   | 631   | 6.69   | 450 | 6.24   | 114   | 4.94   | -112  | 5.89   |   |
|    | 688  | 0.8     | 1380 | 1.0    | 2927 | 1.2     | 3580 | 1.4     | 4927 | 1.6     | 5560 | 1.8     | 5030  | * 1.9   | 3900   | 2.2     | 3730   | 2.2    | 3140 | 2.2    | 2210 | 1.9    | 765  | 1.7    | 2080 | 1.7    | 2270 | 1.8    | 1380  | 1.9    | 990 | 2.1    | 183   | 2.5    | -108  | -      |   |
|    | 55   | 132.91  | 56   | 137.33 | 71   | 174.97  | 72   | 178.49  | 73   | 180.95  | 74   | 183.85  | 75    | 186.21  | 76     | 190.20  | 77     | 192.22 | 78   | 195.08 | 79   | 196.97 | 80   | 200.59 | 81   | 204.38 | 82   | 207.20 | 83    | 208.98 | 84  | (209)  | 85    | (210)  | 86    | (222)  |   |
| 6  | Cs   | Ba      | Lu   | Hf     | Ta   | W       | Re   | Os      | Ir   | Pt      | Au   | Hg      | Tl    | Pb      | Bi     | Po      | At     | Rn     |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
|    | 29   | 1.90    | 714  | 3.76   | 1652 | 9.84    | 2222 | 13.31   | 2996 | 16.5    | 3410 | 19.3    | 3180  | 21.0    | 3050   | 22.6    | 2454   | 22.7   | 1769 | 21.4   | 1063 | 19.3   | -38  | 13.6   | 303  | 11.85  | 327  | 11.4   | 271   | 9.8    | 254 | 9.3    | (302) | -      | (-71) | 9.73   |   |
|    | 690  | 0.7     | 1640 | 0.9    | 3327 | 1.2     | 5400 | 1.3     | 5425 | 1.5     | 5930 | 1.7     | 5900  | 1.9     | 5500   | 2.2     | 4500   | 2.2    | 3830 | 2.2    | 2970 | 2.4    | 357  | 1.9    | 1457 | 1.8    | 1725 | 1.9    | 1560  | 1.9    | 962 | * 2.0  | 337   | * 2.2  | -62   | * -    |   |
|    | 87   | (223.0) | 88   | 226.03 | 103  | (262.1) | 104  | (261.1) | 105  | (262.1) | 106  | (263.1) | 107   | (264.1) | 108    | (265.1) | 109    | (268)  | 110  | (269)  | 111  | (272)  | 112  | (277)  |      |        | 114  | (289)  |       |        | 116 | (289)  |       |        | 118   | (293)  |   |
| 7  | Fr   | Ra      | Lr   | Rf     | Db   | Sg      | Bh   | Hs      | Mt   | Uun     | Uuu  | Uub     |       |         |        |         |        |        |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
|    | (27) | -       | 700  | 5.0    | -    | -       | -    | -       | -    | -       | -    | -       | -     | -       | -      | -       | -      | -      |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |
|    | 677  | * 0.7   | 1140 | * 0.9  | -    | -       | -    | -       | -    | -       | -    | -       | -     | -       | -      | -       | -      | -      |      |        |      |        |      |        |      |        |      |        |       |        |     |        |       |        |       |        |   |

Atomic number — 43 (98.91) — Atomic mass (mean relative)

Symbol — Tc

Melting point [°C] — 2140 11.5 — Density [g/cm<sup>3</sup>], for gases [g/l] (0°C,1013mbar)

Boiling point [°C] — 5030 \* 1.9 — Electronegativity

Radioactive

|   |             |      |        |       |        |       |        |      |        |        |          |      |        |      |        |        |        |      |        |      |        |      |        |      |        |      |        |      |        |
|---|-------------|------|--------|-------|--------|-------|--------|------|--------|--------|----------|------|--------|------|--------|--------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|
| 6 | Lanthanoids | 57   | 138.91 | 58    | 140.12 | 59    | 140.91 | 60   | 144.24 | 61     | (145)    | 62   | 150.36 | 63   | 151.96 | 64     | 157.25 | 65   | 158.93 | 66   | 162.50 | 67   | 164.93 | 68   | 167.26 | 69   | 168.93 | 70   | 173.04 |
|   |             | La   | Ce     | Pr    | Nd     | Pm    | Sm     | Eu   | Gd     | Tb     | Dy       | Ho   | Er     | Tm   | Yb     |        |        |      |        |      |        |      |        |      |        |      |        |      |        |
|   |             | 920  | 6.17   | 795   | 6.67   | 935   | 6.77   | 1024 | 7.00   | (1027) | 7.22     | 1072 | 7.54   | 828  | 5.26   | 1312   | 7.89   | 1356 | 8.27   | 1407 | 8.54   | 1461 | 8.80   | 1497 | 9.05   | 1545 | 9.33   | 824  | 6.98   |
|   |             | 3470 | 1.1    | 3468  | 1.1    | 3127  | 1.1    | 3027 | 1.2    | 2460   | *        | 1790 | 1.2    | 1439 | -      | 3000   | 1.1    | 2800 | 1.2    | 2600 | -      | 2600 | 1.2    | 2900 | 1.2    | 1727 | 1.2    | 1196 | 1.1    |
|   |             | 89   | (227)  | 90    | 232.04 | 91    | 231.04 | 92   | 238.03 | 93     | (237.05) | 94   | (244)  | 95   | (243)  | 96     | (247)  | 97   | (247)  | 98   | (251)  | 99   | (254)  | 100  | (257)  | 101  | (258)  | 102  | (259)  |
| 7 | Actinoids   | Ac   | Th     | Pa    | U      | Np    | Pu     | Am   | Cm     | Bk     | Cf       | Es   | Fm     | Md   | No     |        |        |      |        |      |        |      |        |      |        |      |        |      |        |
|   |             | 1050 | 10.1   | 11750 | 11.7   | (1230 | 15.4   | 1132 | 19.07  | 637    | 19.5     | 640  | 19.81  | 994  | 13.7   | (1340) | 13.51  | -    | -      | -    | -      | -    | -      | -    | -      | -    | -      | -    | -      |
|   |             | -    | * 1.1  | 3850  | * 1.3  | -     | * 1.4  | 3818 | * 1.4  | 3900   | * 1.3    | 3235 | * 1.3  | -    | * 1.3  | 3100   | * -    | -    | -      | -    | -      | -    | -      | -    | -      | -    | -      | -    | -      |

# ChemGlobe - Periodic table of elements

<http://periodictable.tsx.org>

## Conditions of use

The author tries to ensure that the information within this file is quality information but you and I both have to accept there may be errors. A condition of your use of "ChemGlobe - Periodic Table of the Elements" is that you accept the author does not have any liability for error or omission.

You may freely distribute this file as long as you leave it **unmodified**. You are not allowed to charge for the file or its distribution. You may freely distribute printed copies of this file, as long as you do not charge for those copies or their distribution.

If you wish to use this file for commercial purposes, you are invited to contact the author.

## ChemGlobe

ChemGlobe could be called a chemistry documentation project on the WWW. "ChemGlobe - Periodic Table of the Elements" is part of that site. It can be found at <http://chemglobe.tsx.org>.

## Thank you

This printable "ChemGlobe - Periodic Table of the Elements" file is based on the original work of Nick Donati. He gave the source file as a present to the ChemGlobe website. The file was then modified and adjusted to the layout and content of the ChemGlobe website. Nick Donati can be reached by visiting his website at <http://blossom.tsx.org>.

Many mistakes on this file have been corrected in the meantime, thanks to error reports.

Thank you very much!

## Updates

For updates to this printable version of the periodic table, visit <http://periodictable.tsx.org>. This file dates April 15<sup>th</sup> 2000.

## Copyright

© 2000 Paul Kremer (periodictable@gmx.net)

The "ChemGlobe - Periodic Table of the Elements" printable table is available for you to use but its ready availability does not make it your property and it is not in the public domain.