

**Periodic table.** Atomic numbers as subscripts. Red arrows: progressive filling of electrons into s-, p-, d- and f-orbitals. Colour-coded s-, p-, d- and f-blocks. Each of the s-, p-, d- and f-orbitals can hold 2, 6, 10 and 14 electrons, respectively, but more than one electron can enter into an orbital, when going from one element to the next atomic number element. Scerri (2019, Nature 565, 557) discusses irregularities. The filling of 3d after 4s, 4d after 5s, and so on, is due to higher energy of a d-orbital relative to the following s-orbital. Colour-coded element symbols: stable elements (black), highly radioactive elements (grey), weakly radioactive and naturally occurring elements (Th and U, half-lives of 0.7, 4.5 and 14 Gyr for isotopes  $^{235}\text{U}$ ,  $^{238}\text{U}$  and  $^{232}\text{Th}$ , resp.).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1H 1s	3Li 2s	11Na 3s	19K 4s	37Rb 5s	55Cs 6s	87Fr 7s	58Ce 4f	90Th 5f	2He 1s								
2	4Be 2s	12Mg 3s	20Ca 3d	38Sr 4d	56Ba 5d	88Ra 6d	104Rf 6f	59Pr 6f	91Pa 7f	10Ne 1s								
3	21Sc 3d	22Ti 3d	23V 3d	24Cr 3d	25Mn 3d	26Fe 3d	27Co 3d	28Ni 3d	29Cu 3d	30Zn 3d	31Ga 4p	32Ge 4p	33As 4p	34Se 4p	35Br 4p	36Kr 4p		
4	40Zr 4d	41Nb 4d	42Mo 4d	43Tc 4d	44Ru 4d	45Rh 4d	46Pd 4d	47Ag 4d	48Cd 4d	49In 5p	50Sn 5p	51Sb 5p	52Te 5p	53I 5p	54Xe 5p			
5	72Hf 5d	73Ta 5d	74W 5d	75Re 5d	76Os 5d	77Ir 5d	78Pt 5d	79Au 5d	80Hg 5d	81Tl 6p	82Pb 6p	83Bi 6p	84Po 6p	85At 6p	86Rn 6p			
6	105Db 6f	106Sg 6f	107Bh 6f	108Hs 6f	109Mt 6f	110Ds 6f	111Rg 6f	112Cn 6f	113Nh 7p	114Fl 7p	115Mc 7p	116Lv 7p	117Ts 7p	118Og 7p				
7	108Hs 7f	109Mt 7f	110Ds 7f	111Rg 7f	112Cn 7f	113Nh 7f	114Fl 7f	115Mc 7f	116Lv 7f	117Ts 7f	118Og 7f							

**Lanthanides (REEs):** 57La to 71Lu

**Actinides:** 89Ac to 103Lr