

PERIODIC TRENDS GRAPHS- VAJIRA SENEVIRATNE

Covalent Radii of the Halogen Group Elements

Atom	Covalent radius (pm)	Nuclear charge
F	64	+9
Cl	99	+17
Br	114	+35
I	133	+53
At	148	+85

FIGURE 01

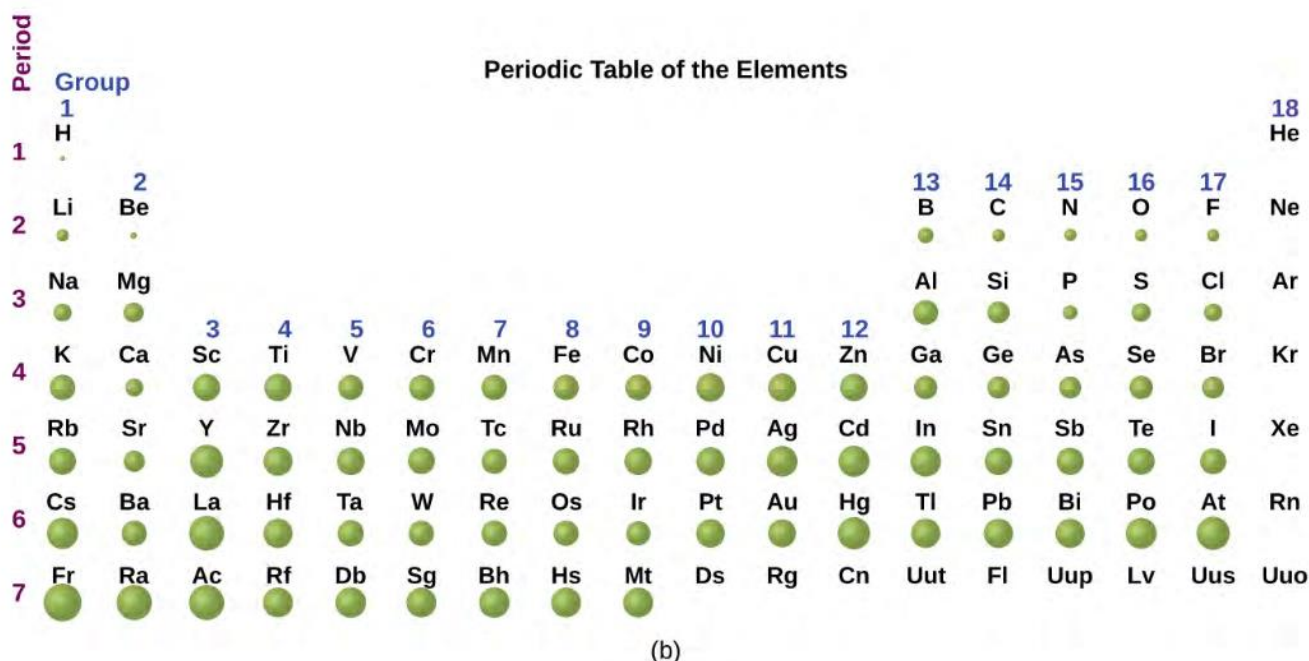
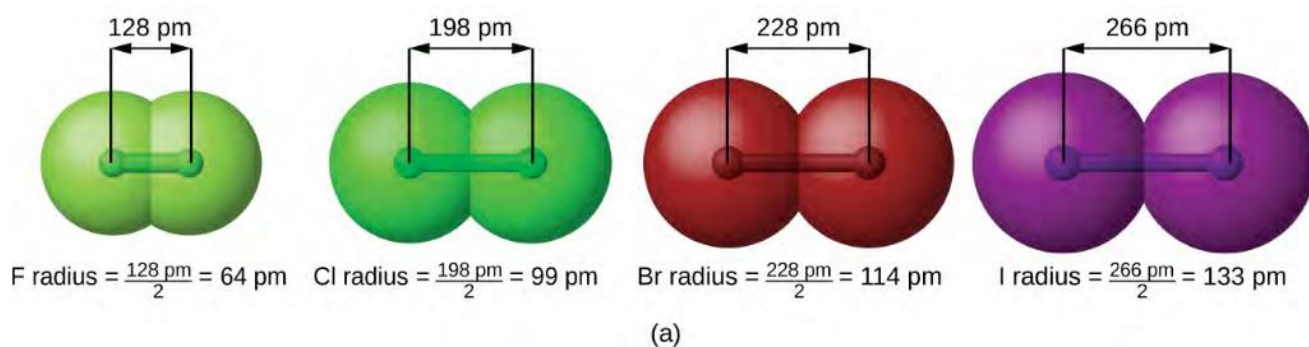


Figure 6.31 (a) The radius of an atom is defined as one-half the distance between the nuclei in a molecule consisting of two identical atoms joined by a covalent bond. The atomic radius for the halogens increases down the group as n increases. (b) Covalent radii of the elements are shown to scale. The general trend is that radii increase down a group and decrease across a period.

FIGURE 02

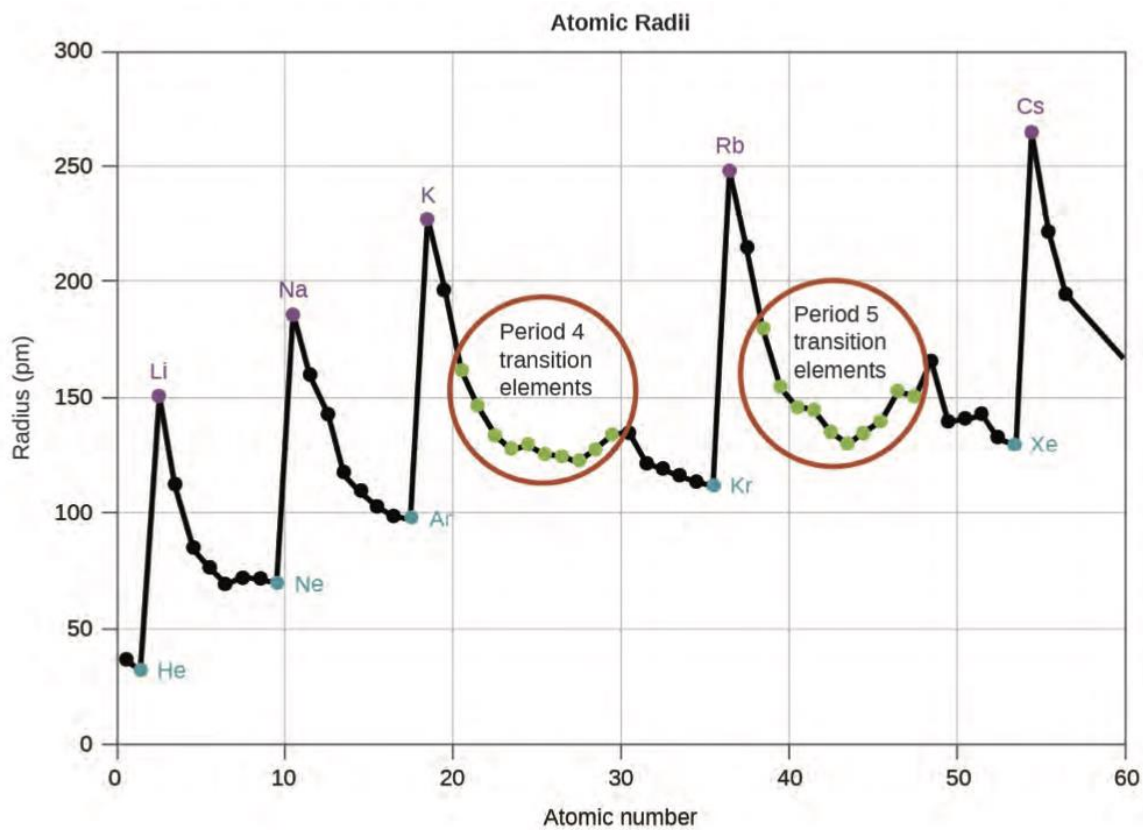


Figure 6.32 Within each period, the trend in atomic radius decreases as Z increases; for example, from K to Kr. Within each group (e.g., the alkali metals shown in purple), the trend is that atomic radius increases as Z increases.

FIGURE 3

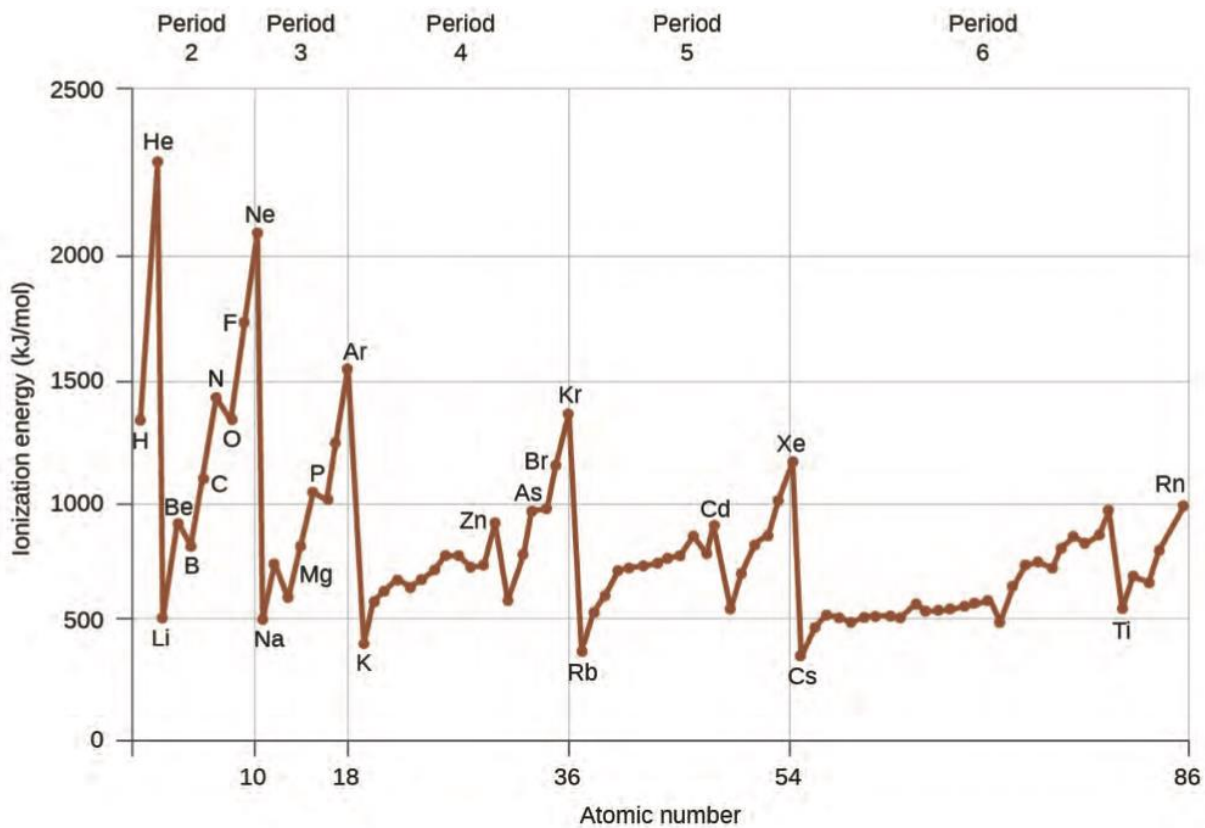


Figure 6.34 The first ionization energy of the elements in the first five periods are plotted against their atomic number.

FIGURE 4

First Ionization Energies of Some Elements (kJ/mol)

Period	Group 1	Group 2	Group 13	Group 14	Group 15	Group 16	Group 17	Group 18										
1	H 1310							He 2370										
2	Li 520	Be 900	B 800	C 1090	N 1400	O 1310	F 1680	Ne 2080										
3	Na 490	Mg 730	Al 580	Si 780	P 1060	S 1000	Cl 1250	Ar 1520										
4	K 420	Ca 590	Sc 630	Ti 660	V 650	Cr 660	Mn 710	Fe 760	Co 760	Ni 730	Cu 740	Zn 910	Ga 580	Ge 780	As 960	Se 950	Br 1140	Kr 1350
5	Rb 400	Sr 550	Y 620	Zr 660	Nb 670	Mo 680	Tc 700	Ru 710	Rh 720	Pd 800	Ag 730	Cd 870	In 560	Sn 700	Sb 830	Te 870	I 1010	Xe 1170
6	Cs 380	Ba 500	La 540	Hf 700	Ta 760	W 770	Re 760	Os 840	Ir 890	Pt 870	Au 890	Hg 1000	Tl 590	Pb 710	Bi 800	Po 810	At ...	Rn 1030
7	Fr ...	Ra 510																

Figure 6.35 This version of the periodic table shows the first ionization energy of (IE_1), in kJ/mol, of selected elements.

FIGURE 5

Successive Ionization Energies for Selected Elements (kJ/mol)

Element	IE_1	IE_2	IE_3	IE_4	IE_5	IE_6	IE_7
K	418.8	3051.8	4419.6	5876.9	7975.5	9590.6	11343
Ca	589.8	1145.4	4912.4	6490.6	8153.0	10495.7	12272.9
Sc	633.1	1235.0	2388.7	7090.6	8842.9	10679.0	13315.0
Ga	578.8	1979.4	2964.6	6180	8298.7	10873.9	13594.8
Ge	762.2	1537.5	3302.1	4410.6	9021.4	Not available	Not available
As	944.5	1793.6	2735.5	4836.8	6042.9	12311.5	Not available

Table 6.3

FIGURE 6

Electron Affinity Values for Selected Elements (kJ/mol)

Period	Group 1	Group 2	Group 13	Group 14	Group 15	Group 16	Group 17	Group 18										
1	H -72							He +20*										
2	Li -60	Be +240*	B -23	C -123	N 0	O -141	F -322	Ne -30										
3	Na -53	Mg +230*	Al -44	Si -120	P -74	S -20	Cl -348	Ar +35*										
4	K -48	Ca +150*	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga -40*	Ge -115	As -7	Se -195	Br -324	Kr +40*
5	Rb -46	Sr +160*	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In -40*	Sn -121	Sb -101	Te -190	I -295	Xe +40*
6	Cs -45	Ba +50*	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl -50	Pb -101	Bi -101	Po -170	At -270*	Rn +40*
7	Fr	Ra																

* Calculated value

Figure 6.36 This version of the periodic table displays the electron affinity values (in kJ/mol) for selected elements.