Ch 8 Textbook Answers

8.3, 8.7, 8.12, 8.15, 8.19, 8.22, 8.29, 8.35, 8.38, 8.40, 8.51, 8.59, 8.63, 8.65

8.3

a) Co

b) [Ar] $4s^2 3d^7$ --> Co

[Ar] $3d^7$ --> Co^{2+}

8.7

a) valence electrons → those that take part in chemical bonding; those electrons in the outermost electron shell

b) N has 5 valence electrons

c) 4 valence electrons

8.12

a) Ca

b) P

c) $[Mg]^{2+}$ OR Mg^{2+}

d) $[S]^{2-}$ OR S^{2-}

8.15

a) AlF_3

b) K_2S

c) Y_2O_3

d) Mg_3N_2

8.19

a) lattice energy → energy required to totally separate one mole of solid ionic compound into its gaseous ions

b)The magnitude of the lattice energy depends on the magnitudes of the charges of the two ions, their radii, and the arrangement of the ions in the lattice. The main factor is the charges because radii of ions do not vary over a large range.

8.22

a) Look at Eq. 8.4

Electrostatic attraction increases with increasing charges of the ions and decreases with increasing radius of the ions. Therefore, lattice energy (i) increases with increasing charge of ions and (ii) decreases as the size of ions increase.

b) KBr < NaF < MgO < ScN

8.29

a) covalent bond → bond formed when two atoms share one or more pair electrons

b) H_2, O_2, N_2, CO, CO_2, SO_2, etc.

c) It's likely to be covalent because it is a gas even below room temperature.

8.35

a) electronegativity → the ability of an atom in a molecule to attract electron to itself

b) 0.7 → 4.0

c) Flourine

d) Cesium → one that is NOT radioactive

8.38

a) O

b) Al

c) Cl

d) F

8.40

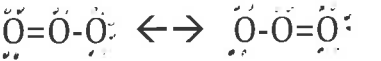
a) Be-F < C-F < O-F

b) S-Br < C-P < O-Cl

c) C-S < N-O < B-F

8.51

a) 

b) 

c) Bond length in NO2- should be shorter because each N-O bond has partial double bond character.

8.59

The most common exceptions are molecules with more than eight electrons around one or more atoms, usually the central atom. Ex. SF_6, PF_5

8.63

a) :Cl-Be-Cl: *This violates the octet rule. Be only has 4 electrons around it.*

0 0 0

b) Cl=Be=Cl ←→ :Cl=-Be-Cl: ←→ :Cl-Be-=Cl:

+1 -2 +1 +2 -2 0 0 -2 +2

c) :Cl-Be-Cl: because the formal charges are minimized

8.65

a)ΔH = -304 kJ

b)ΔH = -82 kJ

c)ΔH = -467 kJ