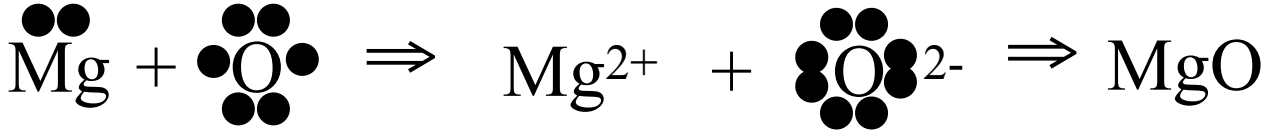
8.2

a) A:Y and B:X produce 1:1 cation/anion ratios

b) A:Y will produce a salt with a greater lattice energy because the charge of the anion and cation are both 2

8.3

a) The sodium ions are purple because they are smaller.
b) The green colored balls represent the chlorine ions.
c) The central chlorine ions (5) experiences 4 attractive interactions.
d) The central chlorine ions (5) experiences 4 repulsive interactions.
e) The sum of the attractive forces is greater than the sum of the repulsive forces.
f) If this pattern were extended indefinitely in 2D, the lattice energy would be negative because the formation of attractive forces releases energy and the attractive forces dominate, as established in (e)

8.17  $\Rightarrow$ Mg^{2+} + $\Rightarrow$ MgO

b) There are two electrons transferred.

c) The Mg metal loses the electrons.

8.21

a) Lattice energy is the amount of energy needed to transform 1 mole of a salt into its component gaseous ions.

b) The lattice energy for an ionic compound is governed by the radius of the ions and the charge of the ions.

8.23

a) The process that defines lattice energy is technically endothermic, because it measures the ionization of a solid salt. Practically, we think of it as an exothermic process as the salt forms.

b) $Na^{+1}_{(g)} + Cl^{-1}_{(g)} \Longrightarrow NaCl_{(s)}$ (or opposite - see above)

c) The magnitude of the charges on Ca and O are greater than Na and Cl. As such, NaCl will have a lower lattice energy that CaO because lattice energy varies significantly with ion charge.

8.29

CaO, like most ionic solids, is stable relative to its component elements not because of the energies involved in forming the individual ions, but because of the stability of the ionic lattice. As such (a) is the correct explanation.