**Quiz 8**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. Given the following data (11 points):

Mg (s) → Mg (g) ∆H° = 148 kJ

F2 (g) → 2 F (g) ∆H° = 159 kJ

Mg (g) → Mg+ (g) + e- ∆H° = 738 kJ

Mg+ (g) → Mg2+ (g) + e- ∆H° = 1450 kJ

F (g) + e- → F- (g) ∆H° = -328 kJ

Mg (s) + F2 (g) → MgF2 (s) ∆H° = -1123 kJ

* 1. Use the following to calculate the ∆H°lattice of MgF2:

∆H°lattice = -1123 kJ – 148 kJ – 159 kJ – 738 kJ – 1450 kJ – 2(-328 kJ) = -2962 kJ

* 1. Compared with the lattice energy of LiF (1050 kJ/mol) or the lattice energy of NaCl (788 kJ), does the relative magnitude of the value for MgF2 surprise you? Explain.

No, both of these compounds have +1 and -1 charges, whereas MgF2 has a +2 and -1 charge, because E α q1q2 and the magnitude of the charges is higher the lattice energy should also be higher.

1. What is the difference between a titrant and an analyte (3 points)?

The titrant is the solution of known concentration. It is usually added from a buret to help determine the concentration of another solution. The analyte is the solution of unknown concentration.

1. What is the difference between the equivalence point and the end point in a titration (3 points)?

The equivalence point occurs when all of the hydrogen ions have been neutralized. The end point occurs when the indicator permanently changes color.

1. What is a back titration (3 points)?

Back titration is a method of indirect titration, where the concentration of the analyte is determined by reacting it with a known number of moles of excess reagent. The excess reagent is then neutralized by titrating it against a second reagent of known concentration. The concentration of the analyte in the original solution can be found based on the amount of reagent consumed.