

Name  
AP Chemistry  
Ionic Properties

I. Objectives:

How do ionic bonds form?

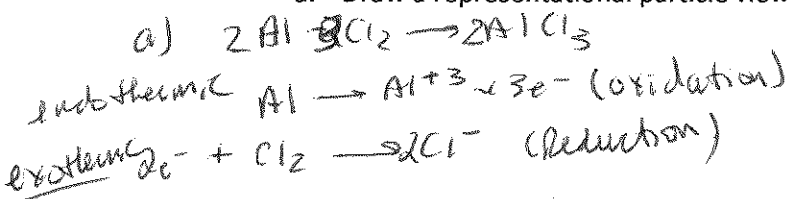
- a. Student will be able to use the ideas of Oxidation reduction to justify how an ionic bond is formed.
- b. Student will be able to determine if a substance is using ionic bonding.
- c. Students will be able to write ionic formulas and names for specific ionic compounds.
- d. Students should be able to draw a representation of an ionic crystal and relate that drawing to the chemical formula of that substance.

II. What are the properties of ionic compounds?

- a. A student should be able to determine how ionic charge and ionic radii affects the Melting point of an ionic compound. (Coulombs law)
- b. Student should be able to indicate, why or why not, an ionic compound dissolves in a solvent.
- c. Student will be able to write out reactions showing how individual ionic compounds dissociate when dissolving.

1.  $AlCl_3$  is an ionic solid.

- a. This ionic solid can be produced by the production of oxidation of aluminum and the reduction of chlorine. Write a chemical equation representing this transition.
- b. Split the reaction into two half reactions.
- c. Indicate if each half reaction is exothermic or endothermic.
- d. Draw a representational particle view of solid  $AlCl_3$  in the box.



2.  $NaCl$  and  $AlCl_3$  are placed in a clay pot ( $SiO_2$ ) A student heats the two substances in the pot, checks the heating at  $1000C$  and finds the  $NaCl$  has melted and checks at  $2000C$  finding both salts have melted.

- a. What about the  $AlCl_3$  allows it to melt at a higher temperature.  
 → Larger Coulombic Attraction → larger charges
- b. Create an ionic salt that would melt at a higher temperature than  $AlCl_3$ .  
 $Al_2O_3$
- c. Create an ionic salt that would melt at a temperature between the chloride salts.  
 $Al_2S_3$
- d. Write the chemical reaction for the melting of  $AlCl_3$   
 (Ionic Bond Broken)  $AlCl_3 \rightarrow Al^{+3} + Cl^{-}$
- e. Student checks again at  $3000C$ . All salts are melted yet the container is still holding up. Why?  
 → Stronger Bond? Network Covalent
- f.  $AlCl_3$  has a very high melting point but dissolved in water very nicely. In the box provided draw a particle view of this salt dissolved. Show the salt and water in your drawing.

