

AP Worksheet 6b (Enthalpy)

1. Consider the reaction for the formation of **one mole** of aluminum oxide.
 - a. There are two ways to write a balanced thermochemical equation (including ΔH). Show both ways for the formation of this compound.

 - b. Is this process endothermic or exothermic?

 - c. Construct a heat-content diagram (reaction profile) for this reaction.

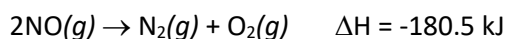
2. Suppose a 7.40-gram sample of ammonium nitrate salt is dissolved in a calorimeter containing 100. mL of water at 24.2 °C. The dissolving of the salt caused the water temperature to drop to 18.4 °C.
 - a. Write the net-ionic dissociation equation for the dissolving of this salt.

 - b. Is the dissolving of ammonium nitrate and exothermic or endothermic process?

 - c. How many moles of ammonium nitrate dissolved?

 - d. Calculate the ΔH (in kJ/mol) for this process.

3. Consider the following reaction:



- a. How much energy would be released if 15.0 grams of $\text{N}_2(g)$ were formed?

- b. How many molecules of $\text{NO}(g)$ were consumed if 250. kJ of energy was released?

- c. How many grams of $O_2(g)$ were produced if 250. kJ were released?
4. How much energy is released when 152 grams of water at a temperature of $85\text{ }^\circ\text{C}$ is cooled to $0.\text{ }^\circ\text{C}$ and subsequently frozen?
- For water,
heat of fusion = 6.02 kJ/mol
heat of vaporization = 40.7 kJ/mol
specific heat = $4.18\text{ J/g }^\circ\text{C}$
5. Explain why steam at $100\text{ }^\circ\text{C}$ is more dangerous than an equal amount of boiling water at the same temperature ($100\text{ }^\circ\text{C}$).
6. Sketch a **cooling** curve for sea-level water vapor nvv. Be sure to do the following:
- Properly label the axes.
 - Identify the condensation and freezing points on the vertical axis.
 - Identify what state(s) of matter are in existence on the horizontal axis.
 - Identify the areas of changing kinetic and potential energy on the curve.