Name: \_\_\_\_\_\_ Period: \_\_\_\_\_

# **Guided Notes: Enthalpy and Phase Changes**

#### **Endothermic vs. Exothermic**

Endothermic or exothermic?

 $H_2O_{(I)} \rightarrow H_2O_{(g)} \quad \Delta H_{vap} = +40.7 \text{ kJ}$ 

 $H_2O_{(g)} \rightarrow H_2O_{(l)} \quad \Delta H_{cond} = -40.7 \text{ kJ}$ 

- Not a chemical reaction, but it is a phase change which requires energy
- solid ↔ liquid: heat of \_\_\_\_\_\_
- liquid ↔ gas: heat of

#### **Boiling and Condensing**

- Molar enthalpy(heat) of vaporization  $(\Delta H_{vap})$  \_\_\_\_\_ required to \_\_\_\_\_ one mole of liquid
- How much energy is required to boil 25.5g of water at 100°C?  $H_2O(I) \rightarrow H_2O(g)$   $\Delta Hvap = +40.7 \text{ kJ}$
- How do you know to use ΔH<sub>vap</sub>?

#### **Melting and Freezing**

- Molar enthalpy (heat) of fusion ( $\Delta$ Hfus)- required to one mole of solid (pg.530)
- How many grams of ice can be melted by providing 2250 kJ of heat at 0°C?

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H_2O_{(s)} \rightarrow H_2O_{(l)} \Delta H_{fus} = +6.01 \text{ kJ}
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How do you know to use ΔH<sub>fus</sub>?

## Change in Temperature vs. Change in State

- If you want to change the state...
  - Use
- If you want to change the temperature...
  - Use

## **Practice Problems**

- How much heat is required to melt 25.3 g of ice?
- How much heat is released when 4.8 g of steam condenses into water? ۲

# **Check for understanding**

• How much heat is required to turn 14.5g of water into vapor?

• How much heat is required to turn 45.3 g of ice into liquid water?