

11/5 Today: Ch 9 sect 1-7

11/6 Tuesday: Expt 10, problem club with Ali

11/7 Wednesday: Ch 9 continued

11/9 Friday: catch-up and review

11/12 Monday: CK4

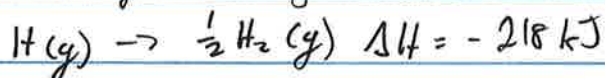
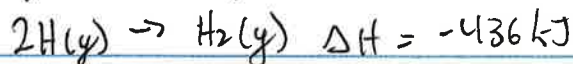
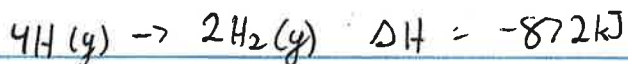
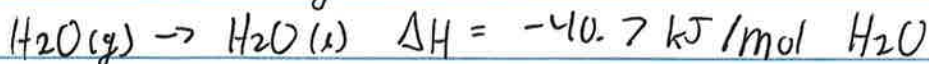
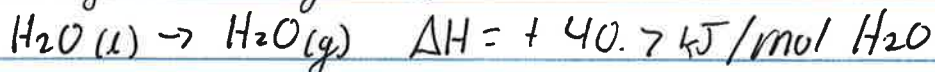
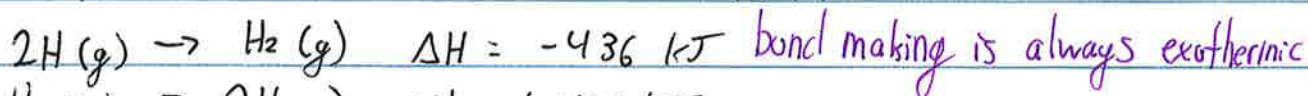


$$\Delta H = \Delta E + P\Delta V \quad \text{(when volume doesn't change)}$$

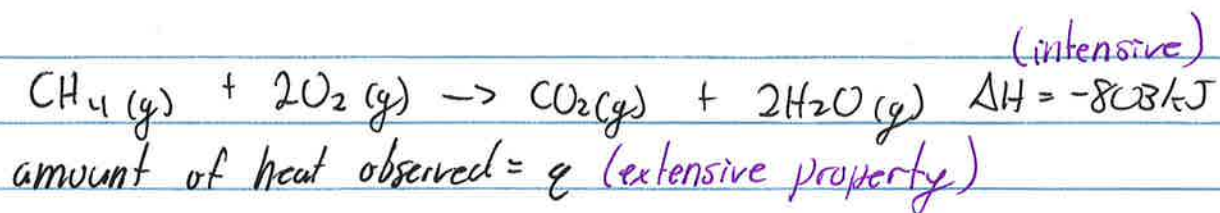
$\Delta =$  change

$$\Delta H = \Delta E$$

- if heat is given off,  $\Delta H < 0$ , exothermic
- if it takes heat,  $\Delta H > 0$ , endothermic



when you multiply or divide the equation you do the same to the  $\Delta H$



reaction

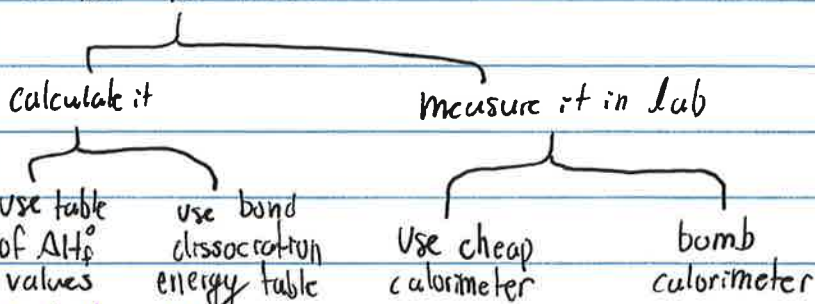
balloon contained 0.19 mol  $\text{CH}_4$

$$q = \Delta H \times n$$

$$q = (-803 \text{ kJ/mol CH}_4)(0.19 \text{ mol CH}_4)$$

$$q = -153 \text{ kJ}$$

What is  $\Delta H$ ?

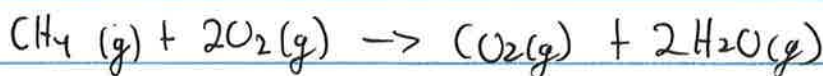


standard conditions  
298 K, 1 atm

$\Delta H_f^\circ$   
formation

$\Delta H_{rxn}^\circ$

$$\Delta H_{rxn}^\circ = -802.3 \text{ kJ}$$



$$-74.8 \text{ kJ/mol CH}_4 \quad 0 \text{ kJ/mol O}_2 \quad -393.5 \text{ kJ/mol CO}_2 \quad -241.8 \text{ kJ/mol H}_2\text{O}$$

$$\times -1 \text{ mol CH}_4 \quad \times 2 \text{ mol O}_2 \quad \times 1 \text{ mol CO}_2 \quad \times 2 \text{ mol H}_2\text{O}$$

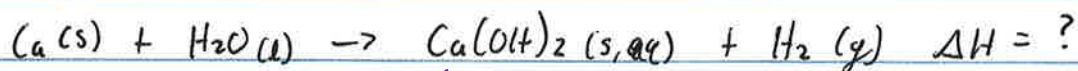
$$+74.8 \text{ kJ} \quad +0 \quad -393.5 \text{ kJ} \quad -483.6 \text{ kJ}$$

## Coffee cup calorimeter



← 200.0g H<sub>2</sub>O

T<sub>i</sub> = 22.5°C → T<sub>f</sub> = 39.9°C



✓ specific heat

$$q_{\text{cal}} = 4.18 \frac{\text{J}}{\text{g sol'n} \cdot \text{degrees}}$$

T<sub>f</sub> - T<sub>i</sub>

$$q = \left( \frac{4.18 \text{ J}}{\text{g sol'n} \cdot \text{degrees}} \right) (200.80 \text{ g sol'n}) (39.9 - 22.5)$$

$$q = +14605 \text{ J} = +14.6 \text{ kJ} \quad \text{how much heat the water absorbed}$$

$$q_{\text{rxn}} = -14.6 \text{ kJ} \quad \text{how much heat the Ca gave off}$$

$$q_{\text{cal}} = -q_{\text{rxn}}$$

$$\Delta H = q / n$$

$$\Delta H = -14.6 \text{ kJ} / (0.80 \text{ g Ca} / 40.078 \text{ g/mol})$$

$$\Delta H = -732 \text{ kJ/mol Ca}$$