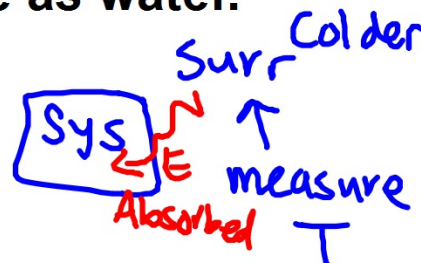


Day 6.3 Warm-Up



2.11 grams of urea are dissolved in 100.0 mL of water in a coffee cup calorimeter. The initial temperature of water is 22.2 C. The final temperature of the solution is 20.3 C. Assume the density and specific heat of the solution is the same as water.

- 1) calculate heat flow, q , in kJ.
- 2) calculate ΔH , in kJ/mol rxn



1) $q = mc_p\Delta T$

$$q = (2.11 \text{ g} + 100 \text{ g}) \left(4.184 \frac{\text{J}}{\text{g}^\circ\text{C}} \right) (22.2^\circ\text{C} - 20.3^\circ\text{C})$$

$$q = 810 \text{ J} = .81 \text{ kJ}$$

$$q_{\text{sys}} = +.81 \text{ kJ}$$

2) $\Delta H = \frac{q_{\text{sys}}}{\text{mol LR}}$

$$\frac{2.11 \text{ g CH}_4\text{N}_2\text{O}}{60.05 \text{ g}} \times \frac{1 \text{ mol CH}_4\text{N}_2\text{O}}{1 \text{ mol CH}_4\text{N}_2\text{O}} = 0.0351 \text{ mol CH}_4\text{N}_2\text{O}$$

$$\Delta H = \frac{+.81 \text{ kJ}}{0.0351 \text{ mol}} = 23 \frac{\text{kJ}}{\text{mol rxn}}$$

$$\frac{2 \text{ mol urea} \quad | \quad 23 \text{ kJ}}{1 \text{ mol urea}}$$