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$$\Delta H_{R1} = \underline{-1.875 \text{ kJ}}$$

$$\Delta H_{R2} = \underline{-4.678 \text{ kJ}}$$

$$\Delta H_{R3} = \underline{-2.865 \text{ kJ}}$$

$$\text{mol}_{R1} = 2.00 / (22.99 + 16.00 + 1.008) = \underline{0.05 \text{ mol}}$$

$$\text{mol}_{R2} = 2.00 / (22.99 + 16.00 + 1.008) = \underline{0.05 \text{ mol}}$$

$$\text{mol}_{R3} = 1.0 * 50.1000 = \underline{0.05 \text{ mol}}$$

$$\Delta H / \text{mol}_{R1} = -1.875 / 0.05 = \underline{-37.5 \text{ kJ/mol}}$$

$$\Delta H / \text{mol}_{R2} = -4.678 / 0.05 = \underline{-93.6 \text{ kJ/mol}}$$

$$\Delta H / \text{mol}_{R3} = -2.865 / 0.05 = \underline{-57.3 \text{ kJ/mol}}$$

$$-\Delta H_{R1} \quad \Delta H_{R2} \quad \Delta H_{R3}$$

$$-37.5 + -57.3 = \underline{-94.8 \text{ kJ/mol}}$$

$$37.5 + -93.6 = \underline{-56.1 \text{ kJ/mol}}$$

$$|-94.8 + 93.6| / |-93.6| * 100 = \underline{1.28\% \text{ error}}$$

Conclusion:

The purpose of the lab was to practice applying Hess's Law and verifying that the heat of a reaction is equal to the sum of the other reactions. We achieved this by using a coffee cup calorimeter to combine NaOH with water and HCl and using a thermal probe to measure the initial and final temperature, which was used along with the mass or volume of NaOH, to find the heat released, which was used to find ΔH . We then used the mass of NaOH to find the

$\Delta H/\text{mol}$. We then added two reactions and compared them against the third to verify the data/calculations.

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