

Experimental Data: Example Calculation.

| | <u>Mass of CaO</u> | <u>Volume</u> | <u>Initial Temp</u> | <u>Final temp</u> |
|---|--------------------|---------------|---------------------|-------------------|
| ① | 1.511g | 100.0 mL | 20.0°C | 26.0°C |
| ② | 1.505g | 100.0 mL | 19.8°C | 21.0°C |



$$m = 100.0 \text{ g}$$

$$c = 4.184 \text{ J/g}^\circ\text{C}$$

$$\Delta t = (26.0^\circ\text{C} - 20.0^\circ\text{C})$$

$$Q = mc \Delta t$$

$$Q = (100.0 \text{ g})(4.184 \text{ J/g}^\circ\text{C})(6.0^\circ\text{C})$$

$$Q = 2510.4 \text{ J}$$

$$Q = 2.5104 \text{ kJ}$$

$$\Delta H = -Q$$

$$\Delta H = -2.5104 \text{ kJ}$$

↑
heat released from reacting
1.511g of CaO.

Molar enthalpy

$$\frac{\Delta H}{\text{mol}} = \frac{-2.5104 \text{ kJ}}{0.026943651 \text{ mol}}$$

$$1.511 \text{ g} \times \frac{1 \text{ mol CaO}}{56.08 \text{ g}}$$

$$\Delta H = -93.2 \text{ kJ/mol}$$



$$m = 100.0\text{g}$$

$$c = 4.184\text{ J/g}^\circ\text{C}$$

$$\Delta t = (21.0^\circ\text{C} - 19.8^\circ\text{C})$$

$$Q = (100.0\text{g})(4.184\text{ J/g}^\circ\text{C})(1.2^\circ\text{C})$$

$$Q = 502.08\text{ J}$$

$$Q = 0.50208\text{ kJ}$$

$$\Delta H = -Q$$

$$\Delta H = -0.50208\text{ kJ}$$

* Molar enthalpy *

$$1.505\text{g CaO} \times \frac{1\text{ mol CaO}}{56.08\text{g}}$$

$$\frac{\Delta H}{\text{mol}} = \frac{-0.50208\text{ kJ}}{0.026836661}$$

$$= 0.026836661\text{ mol}$$

$$\Delta H = -18.7\text{ kJ/mol}$$

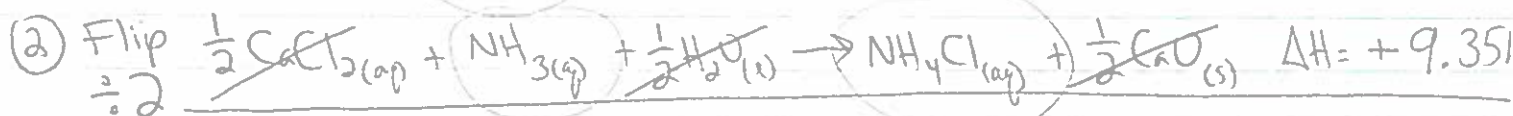
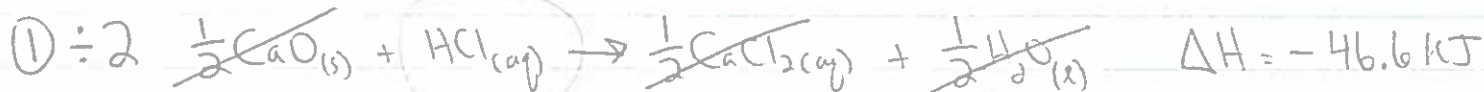
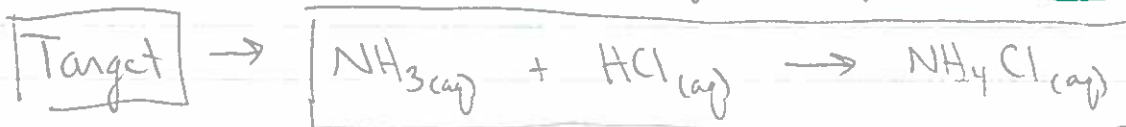
ΔH per mole



$$\Delta H = -93.2\text{ kJ}$$



$$\Delta H = -18.7\text{ kJ}$$



$$\% \text{ Error} = \left| \frac{-56.2\text{ kJ/mol} - (-37.25\text{ kJ/mol})}{-56.2\text{ kJ/mol}} \right| \times 100\% = 33.7\% \text{ error}$$