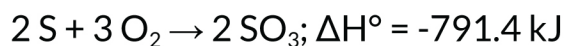


1. How much heat will be released when 6.44 g of sulfur reacts with excess O₂?



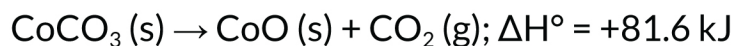
2. Find the enthalpy change when 1.99 g of Na₂O₂ reacts with excess water.



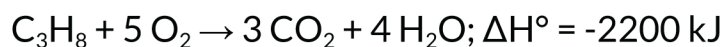
3. Find the enthalpy change when 200 mL of 4 M ammonia reacts with excess hydrogen bromide.



4. Compute the enthalpy change when decomposing 0.772 g cobalt (II) carbonate into cobalt (II) oxide and carbon dioxide.



5. What mass of propane, C₃H₈, must be burned to produce 76,000 kJ of energy?



6. Compute the enthalpy change for producing 17.1 L of NO₂ at 1.5 atm and 30 °C.

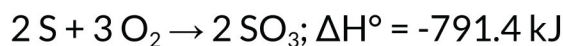


Name : _____

Date : _____

Answers

1. How much heat will be released when 6.44 g of sulfur reacts with excess O₂?



$$6.44 \text{ g S} \times (1 \text{ mol S}/32 \text{ g S}) \times (-791.4 \text{ kJ}/2 \text{ mol S}) = -79.6 \text{ kJ}$$

2. Find the enthalpy change when 1.99 g of Na₂O₂ reacts with excess water.



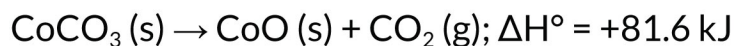
$$1.99 \text{ g Na}_2\text{O}_2 \times (1 \text{ mol Na}_2\text{O}_2/77.978 \text{ g Na}_2\text{O}_2) \times (-215 \text{ kJ}/2 \text{ mol Na}_2\text{O}_2) = -2.743 \text{ kJ}$$

3. Find the enthalpy change when 200 mL of 4 M ammonia reacts with excess hydrogen bromide.



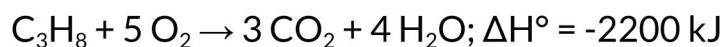
$$0.200 \text{ L NH}_3 \times (4 \text{ mol NH}_3/1 \text{ L NH}_3) \times (-188 \text{ kJ}/1 \text{ mol NH}_3) = -150.4 \text{ kJ}$$

4. Compute the enthalpy change when decomposing 0.772 g cobalt (II) carbonate into cobalt (II) oxide and carbon dioxide.



$$0.772 \text{ g CoCO}_3 \times (1 \text{ mol CoCO}_3/118.941 \text{ g CoCO}_3) \times (+81.6 \text{ kJ}/1 \text{ mol CoCO}_3) = +0.5296 \text{ kJ}$$

5. What mass of propane, C₃H₈, must be burned to produce 76,000 kJ of energy?



$$-76,000 \text{ kJ} \times (1 \text{ mol C}_3\text{H}_8/-2200 \text{ kJ}) \times (44 \text{ g C}_3\text{H}_8/1 \text{ mol C}_3\text{H}_8) = 1520 \text{ g C}_3\text{H}_8$$

6. Compute the enthalpy change for producing 17.1 L of NO₂ at 1.5 atm and 30 °C.



$$\text{Number of moles of NO}_2: n = PV/RT = (1.5 \text{ atm} \times 17.1 \text{ L})/(0.082 \text{ L-atm} \times (273 + 30 \text{ K})) = 1.03 \text{ mol NO}_2$$

$$1.03 \text{ mol NO}_2 \times (-114 \text{ kJ}/2 \text{ mol NO}_2) = -58.76 \text{ kJ}$$

Name : _____

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