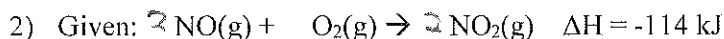


- a) Calculate the quantity of heat (kJ) produced by the reaction of 50.0 g of dinitrogen monoxide with excess ammonia.

$$50.0 \text{ g N}_2\text{O} \left| \frac{1 \text{ mol N}_2\text{O}}{44.02 \text{ g N}_2\text{O}} \right| \frac{-1010 \text{ kJ}}{3 \text{ mol N}_2\text{O}} = \boxed{-382 \text{ kJ}}$$

- b) How many grams of dinitrogen monoxide are required to produce 789 kJ of heat?

$$-789 \text{ kJ} \left| \frac{3 \text{ mol N}_2\text{O}}{-1010 \text{ kJ}} \right| \frac{44.02 \text{ g N}_2\text{O}}{1 \text{ mol N}_2\text{O}} = \boxed{103 \text{ g N}_2\text{O}}$$

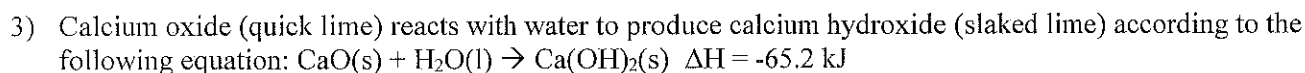


- a) What mass of nitrogen monoxide is required to produce 457 kJ of heat?

$$-457 \text{ kJ} \left| \frac{2 \text{ mol NO}}{-114 \text{ kJ}} \right| \frac{30.01 \text{ g NO}}{1 \text{ mol NO}} = \boxed{241 \text{ g NO}}$$

- b) What volume of nitrogen dioxide at STP is produced when 421 kJ of heat are released?

$$-421 \text{ kJ} \left| \frac{2 \text{ mol NO}_2}{-114 \text{ kJ}} \right| \frac{22.4 \text{ L NO}_2}{1 \text{ mol NO}_2} = \boxed{165 \text{ L NO}_2}$$



- a) How many joules of heat are released from the reaction of 28.4 g of calcium oxide with excess water?

$$28.4 \text{ g CaO} \left| \frac{1 \text{ mol CaO}}{56.08 \text{ g CaO}} \right| \frac{-65.2 \text{ kJ}}{1 \text{ mol CaO}} \left| \frac{1000 \text{ J}}{1 \text{ kJ}} \right| = \boxed{3.30 \times 10^4 \text{ J}}$$

- b) How much heat (kJ) is produced when 54 g of CaO react with 31 g of H₂O? (Hint: What is the limiting reactant?)

$$54 \text{ g CaO} \left| \frac{1 \text{ mol CaO}}{56.08 \text{ g CaO}} \right| \frac{-65.2 \text{ kJ}}{1 \text{ mol CaO}} = \boxed{-63 \text{ kJ}}$$

$$31 \text{ g H}_2\text{O} \left| \frac{1 \text{ mol H}_2\text{O}}{18.02 \text{ g H}_2\text{O}} \right| \frac{-65.2 \text{ kJ}}{1 \text{ mol H}_2\text{O}} = \boxed{-112 \text{ kJ}}$$