

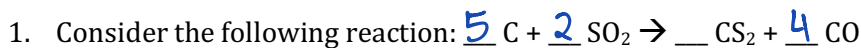
Limiting & Excess Reactants

Name:

Date:

Block:

Key



a. What mass of CS_2 is produced when 17.5 g of C are reacted with 39.5 g of SO_2 ?

$$17.5\text{g C} \times \frac{1\text{mol C}}{12.01\text{g C}} \times \frac{1\text{mol CS}_2}{5\text{mol C}} \times \frac{76.15\text{g CS}_2}{1\text{mol CS}_2} = \boxed{22.2\text{g CS}_2} \leftarrow \text{limiting}$$

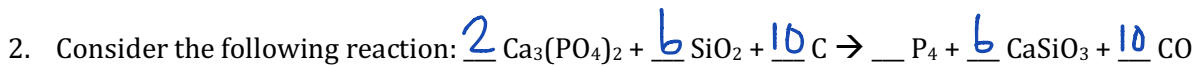
$$39.5\text{g SO}_2 \times \frac{1\text{mol SO}_2}{64.07\text{g SO}_2} \times \frac{1\text{mol CS}_2}{2\text{mol SO}_2} \times \frac{76.15\text{g CS}_2}{1\text{mol CS}_2} = 23.5\text{g CS}_2$$

b. What mass of the excess reactant will be left over?

$$17.5\text{g C} \times \frac{1\text{mol C}}{12.01\text{g C}} \times \frac{2\text{mol SO}_2}{5\text{mol C}} \times \frac{64.07\text{g SO}_2}{1\text{mol SO}_2} = 37.3\text{g SO}_2 \leftarrow \text{What we used}$$

Have - Used = Excess

$$39.5\text{g SO}_2 - 37.3\text{g SO}_2 = \boxed{2.2\text{g SO}_2}$$



a. What mass of P_4 is produced when 41.5 g of $\text{Ca}_3(\text{PO}_4)_2$, 26.5 g of SiO_2 and 7.80 g of C are reacted?

$$41.5\text{g Ca}_3(\text{PO}_4)_2 \times \frac{1\text{mol Ca}_3(\text{PO}_4)_2}{310.18\text{g Ca}_3(\text{PO}_4)_2} \times \frac{1\text{mol P}_4}{2\text{mol Ca}_3(\text{PO}_4)_2} \times \frac{123.88\text{g P}_4}{1\text{mol P}_4} = 8.29\text{g P}_4$$

$$26.5\text{g SiO}_2 \times \frac{1\text{mol SiO}_2}{60.09\text{g SiO}_2} \times \frac{1\text{mol P}_4}{6\text{mol SiO}_2} \times \frac{123.88\text{g P}_4}{1\text{mol P}_4} = 9.11\text{g P}_4$$

$$7.80\text{g C} \times \frac{1\text{mol C}}{12.01\text{g C}} \times \frac{1\text{mol P}_4}{10\text{mol C}} \times \frac{123.88\text{g P}_4}{1\text{mol P}_4} = \boxed{8.05\text{g P}_4} \leftarrow \text{limiting}$$

b. How many grams of each excess reactant will remain unreacted?

$$7.80\text{g C} \times \frac{1\text{mol C}}{12.01\text{g C}} \times \frac{2\text{mol Ca}_3(\text{PO}_4)_2}{10\text{mol C}} \times \frac{310.18\text{g Ca}_3(\text{PO}_4)_2}{1\text{mol Ca}_3(\text{PO}_4)_2} = 40.3\text{g Ca}_3(\text{PO}_4)_2$$

$$41.5\text{g Ca}_3(\text{PO}_4)_2 - 40.3\text{g Ca}_3(\text{PO}_4)_2 = \boxed{1.2\text{g Ca}_3(\text{PO}_4)_2}$$

$$7.80\text{g C} \times \frac{1\text{mol C}}{12.01\text{g C}} \times \frac{6\text{mol SiO}_2}{10\text{mol C}} \times \frac{60.09\text{g SiO}_2}{1\text{mol SiO}_2} = 23.4\text{g SiO}_2$$

$$26.5\text{g SiO}_2 - 23.4\text{g SiO}_2 = \boxed{3.1\text{g SiO}_2}$$