Limiting Reagent and Percent Yield

Examples of Limiting and Excess Reagents

Example: p. 370 # 26

$$Mg + 2HCl \rightarrow MgCl_2 + H_2$$

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$$Mg + 2HCl \rightarrow MgCl_2 + H_2$$

LIMIT

$$6\,g\ HCl \left| \frac{1 \text{ mole } HCl}{36\,g\ HCl} \right| \frac{1 \text{ mole } MgCl_2}{2 \text{ mole } HCl} = .083 \text{ mole } MgCl_2$$

$$5\,g\ Mg \left| \frac{1 \text{ mole } Mg}{24\,g\ Mg} \right| \frac{1 \text{ mole } MgCl_2}{1 \text{ mole } Mg} = .208 \text{ mole } MgCl_2$$

EXCESS

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Percent Yield Formula

$$\% \text{ Yield} = \frac{\text{Actual Yield}}{\text{Theoretical Yield}} \times 100$$

Example: p. 375 # 31

$$SiO_2 + 3C \rightarrow SiC + 2CO$$

27.9 g SiC "ACTUAL"

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$$50\,g\ SiO_2 \left| \frac{1 \text{ mole } SiO_2}{60\,g\ SiO_2} \right| \frac{1 \text{ mole } SiC}{1 \text{ mole } SiO_2} \left| \frac{40\,g\ SiC}{1 \text{ mole } SiC} \right| = 33.3\,g\ SiC$$

THEORETICAL

$$\% \text{ YIELD} = \frac{27.9\,g}{33.3\,g} \times 100 = 83.7\%$$

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