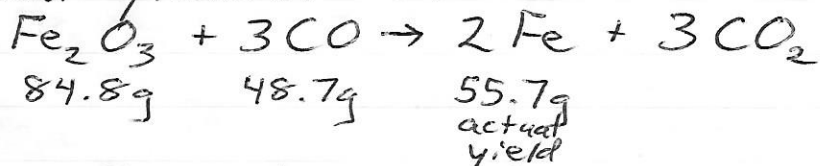


## Percent Yield Sample Problem

① When 84.8 g of  $\text{Fe}_2\text{O}_3$  reacts with 48.7 g of  $\text{CO}$ , 55.7 g of Fe is produced. What is the percent yield of Fe?



Step 1: Find the limiting reagent  
g  $\text{Fe}_2\text{O}_3$   $\rightarrow$  mol  $\text{Fe}_2\text{O}_3$   $\rightarrow$  mol  $\text{CO}$   $\rightarrow$  g  $\text{CO}$

$$84.8\text{g Fe}_2\text{O}_3 \times \frac{1\text{ mol}}{159.7\text{g}} = 0.531\text{ mol Fe}_2\text{O}_3$$

$$0.531\text{ mol Fe}_2\text{O}_3 \times \frac{3\text{ mol CO}}{1\text{ mol Fe}_2\text{O}_3} = 1.593\text{ mol CO}$$

$$1.593\text{ mol CO} \times \frac{28.01\text{g}}{1\text{ mol}} = 44.62\text{g CO}$$

$\rightarrow$   $\text{Fe}_2\text{O}_3$  is the limiting reagent

Step 2: Use  $\text{Fe}_2\text{O}_3$  to find theoretical yield of Fe  
g  $\text{Fe}_2\text{O}_3$   $\rightarrow$  mol  $\text{Fe}_2\text{O}_3$   $\rightarrow$  mol Fe  $\rightarrow$  g Fe

$$84.8\text{g Fe}_2\text{O}_3 \times \frac{1\text{ mol}}{159.7\text{g}} = 0.531\text{ mol Fe}_2\text{O}_3$$

$$0.531\text{ mol Fe}_2\text{O}_3 \times \frac{2\text{ mol Fe}}{1\text{ mol Fe}_2\text{O}_3} = 1.062\text{ mol Fe}$$

$$1.062\text{ mol Fe} \times \frac{55.85\text{g}}{1\text{ mol}} = 59.31\text{g Fe} \leftarrow \text{theoretical yield}$$

Step 3:

$$\% \text{ yield Fe} = \frac{\text{actual yield Fe}}{\text{theoretical yield Fe}} \times 100\%$$

$$= \frac{55.7\text{g}}{59.31\text{g}} \times 100\%$$

$$= 93.9\%$$