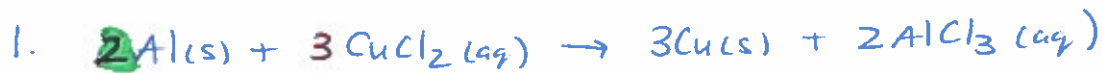


# Limiting Reactant Problem Set



m  $\frac{0.25\text{g}}{\quad}$   $\frac{0.51\text{g}}{\quad}$

M  $\frac{26.982\text{g}}{\text{mol}}$   $\frac{134.452\text{g}}{\text{mol}}$

$0.009265\text{ mol}$   $0.003793\text{ mol}$

2

3

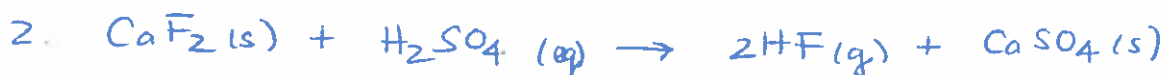
∴ by coefficients

∴  $\text{CuCl}_2$  is the limiting reactant.

$0.00463$

$0.001264$

↑ smaller # ∴ LR



m  $\frac{10.0\text{g}}{\quad}$   $\frac{15.5\text{g}}{\quad}$

M  $\frac{78.074\text{g}}{\text{mol}}$   $\frac{98.077\text{g}}{\text{mol}}$

$0.12808\text{ mol}$

$0.15804\text{ mol}$

1

1

↑ smaller # ∴ LR

∴  $\text{CaF}_2$  is the limiting reactant.



m  $\frac{71.00\text{g}}{\quad}$   $\frac{19.00\text{g}}{\quad}$  ?

M  $\frac{67.451\text{g}}{\text{mol}}$   $\frac{18.015\text{g}}{\text{mol}}$   $\frac{84.458\text{g}}{\text{mol}}$

$1.0526\text{ mol}$

$1.0547\text{ mol}$

6

3

$0.1754$

$0.3516$

↑ smaller # ∴ LR.

$$m_{\text{HClO}_3} = 1.0526 \text{ mol ClO}_2 \times \frac{5 \text{ mol HClO}_3}{6 \text{ mol ClO}_2} \times \frac{84.458 \text{ g HClO}_3}{\text{mol HClO}_3}$$

$$= 74.08 \text{ g}$$

∴ the mass of HClO<sub>3</sub> produced is 74.08 g

OR

$$m_{\text{HClO}_3} = 71.00 \text{ g ClO}_2 \times \frac{1 \text{ mol ClO}_2}{67.451 \text{ g ClO}_2} \times \frac{5 \text{ mol HClO}_3}{6 \text{ mol ClO}_2} \times \frac{84.458 \text{ g HClO}_3}{\text{mol HClO}_3}$$

$$= 74.08 \text{ g} \rightarrow \text{smaller amount}$$

∴ LR

$$m_{\text{HClO}_3} = 19.00 \text{ g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18.015 \text{ g H}_2\text{O}} \times \frac{5 \text{ mol HClO}_3}{3 \text{ mol H}_2\text{O}} \times \frac{84.458 \text{ g HClO}_3}{\text{mol HClO}_3}$$

$$= 148.5 \text{ g}$$



|   |           |          |           |
|---|-----------|----------|-----------|
|   | 61.8 g    | 41.8 g   | ?         |
| m |           |          |           |
| M | 308.746 g | 37.996 g | 111.932 g |
|   | mol       | mol      | mol       |

|             |  |
|-------------|--|
| 0.20016 mol | <span style="border: 1px solid black; padding: 2px;">1.1001 mol</span> |
| 2           | 13   |

∴ 10008      ∴ 08462  
 ↑ smaller # ∴ LR

b)  $m_{\text{MnF}_3} = 1.1001 \text{ mol F}_2 \times \frac{2 \text{ mol MnF}_3}{13 \text{ mol F}_2} \times \frac{111.932 \text{ g MnF}_3}{\text{mol MnF}_3}$

$$= 18.9 \text{ g}$$

OR

$$m_{\text{MnF}_3} = 61.8 \text{ g MnI}_2 \times \frac{1 \text{ mol MnI}_2}{308.746 \text{ g MnI}_2} \times \frac{2 \text{ mol MnF}_3}{2 \text{ mol MnI}_2} \times \frac{111.932 \text{ g MnF}_3}{1 \text{ mol MnF}_3}$$
$$= 22.4 \text{ g}$$

$$m_{\text{MnF}_3} = 41.8 \text{ g F}_2 \times \frac{1 \text{ mol F}_2}{37.996 \text{ g F}_2} \times \frac{2 \text{ mol MnF}_3}{13 \text{ mol F}_2} \times \frac{111.932 \text{ g MnF}_3}{1 \text{ mol MnF}_3}$$
$$= 18.9 \text{ g}$$

↑ smaller # ∴ F<sub>2</sub> is the LR and the mass of MnF<sub>3</sub> produced is 18.9 g.

$$c) N_{\text{MnF}_3} = 1.1001 \text{ mol F}_2 \times \frac{2 \text{ mol MnF}_3}{13 \text{ mol F}_2} \times \frac{6.022 \times 10^{23} \text{ formula units}}{1 \text{ mol}}$$
$$= 1.02 \times 10^{23} \text{ formula units}$$

∴ 1.02 × 10<sup>23</sup> formula units are produced of MnF<sub>3</sub>.



|   |                  |                  |                  |
|---|------------------|------------------|------------------|
| m | <u>5.3 g</u>     | <u>6.9 g</u>     | ?                |
| M | <u>208.233 g</u> | <u>142.041 g</u> | <u>233.388 g</u> |
|   | mol              | mol              | mol              |

|                    |                    |
|--------------------|--------------------|
| <u>0.02545 mol</u> | <u>0.04858 mol</u> |
|                    |                    |

0.02545                      0.04858

↑ smaller # ∴ LR.

$$m_{\text{BaSO}_4} = 0.02545 \text{ mol BaCl}_2 \times \frac{1 \text{ mol BaSO}_4}{1 \text{ mol BaCl}_2} \times \frac{233.388 \text{ g BaSO}_4}{1 \text{ mol BaSO}_4}$$
$$= 5.9 \text{ g}$$

∴ the mass of BaSO<sub>4</sub> produced is 5.9 g.

