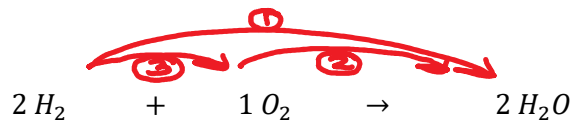
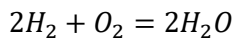


C11 - 4.1 - Excess Mass Notes

If says excess/enough, don't have to do!



$\frac{\text{Mol (s)}}{\text{Mol (s)}}$

1

Mole Ratio 2 mol H₂ : 1 Mol O₂ : 2 Mol H₂O

Assume Coefficient = # of Moles

How many moles of O₂ are required to react with 10 moles of H₂?

2 mol H₂ : 1 Mole O₂
 10 mol H₂ : 5 Moles O₂ OR moles O₂ = 10 moles H₂ × $\frac{1 \text{ moles O}_2}{2 \text{ mol H}_2}$ = 5 moles O₂

20 g Hydrogen gas reacts with 64 g Oxygen gas to produce how much Water. Find Excess.

Convert to Moles 2 20 g H₂ × $\frac{1 \text{ mol}}{2 \text{ g H}_2}$ = 10 mol H₂ 64 g O₂ × $\frac{1 \text{ mol}}{32 \text{ g O}_2}$ = 2 mol O₂

Find mol H₂O produced 3 10 - 4 = 6 mol H₂ × $\frac{2 \text{ g}}{1 \text{ mol}}$ = 12 g H₂ Excess. 2 × 2 = 4

Moles based on H₂ 10 mol H₂ 5 mol O₂

Use Limiting Reactant O₂

We have 10 mol H₂ which needs 5 mol O₂ but we only have 2 mol O₂. H₂ is in Excess.

Moles based on O₂ 4 mol H₂ 2 mol O₂ 4 mol H₂O

Excess

Limiting

4

We have 2 mol O₂ which needs 4 mol H₂ but we have 10 mol H₂. O₂ is Limiting.

Find Product 4 mol H₂O × $\frac{18 \text{ g H}_2\text{O}}{\text{mol}}$ = 72 g H₂O 4

Find amount in Excess 5 Use Limiting Reactant O₂ Only 8g H₂ used! OR

mass H₂ reacted = 64 g O₂ × $\frac{1 \text{ mol O}_2}{32 \text{ g O}_2}$ × $\frac{2 \text{ mol H}_2}{1 \text{ mol O}_2}$ × $\frac{2 \text{ g H}_2}{1 \text{ mol H}_2}$ = 8 g H₂ 4 mol H₂ × $\frac{2 \text{ g}}{\text{mol}}$ = 8 g H₂

Excess : 20 g H₂ - 8 g H₂ = 12 g H₂ Have - Used = Excess Left Over

OR Find out how much each reactant produces and the one that produces less is limiting.

Mass H₂O (H₂) = 20 g H₂ × $\frac{1 \text{ mol H}_2}{2 \text{ g H}_2}$ × $\frac{2 \text{ mol H}_2\text{O}}{2 \text{ mol H}_2}$ × $\frac{18 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}}$ = 180 g H₂O

Could Have done based on another Product*!

Convert to moles

Molar Ratio

Molar Mass

H₂ is in Excess

O₂ is Limiting

Then Do Step

5

Mass H₂O (O₂) = 64 g O₂ × $\frac{1 \text{ mol O}_2}{32 \text{ g O}_2}$ × $\frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol O}_2}$ × $\frac{18 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}}$ = 72 g H₂O 4