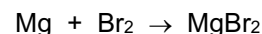


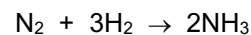


- 1 a How many moles of magnesium bromide are formed when 3.0 moles of magnesium reacts with 2.0 moles of bromine?



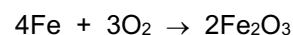
2.0 moles of MgBr₂

- b How many moles of ammonia are formed when 4.0 moles of nitrogen reacts with 9.0 moles of hydrogen?



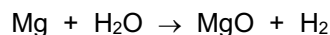
6.0 moles of NH₃

- c How many moles of iron oxide are formed when 12.0 moles of iron reacts with 6.0 moles of oxygen?



4.0 moles of Fe₂O₃

- 2 4.8 g of magnesium is reacted with 4.5 g of steam. Work out which is the limiting reagent and then calculate the mass of magnesium oxide formed.



$$\text{moles Mg} = \frac{\text{mass}}{M_r} = \frac{4.8}{24} = 0.2 \text{ mol}$$

$$\text{moles H}_2\text{O} = \frac{\text{mass}}{M_r} = \frac{4.5}{18} = 0.25 \text{ mol}$$

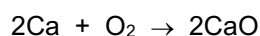
0.2 moles of Mg needs 0.2 moles of H₂O for all the Mg to react,

there is more than enough H₂O and so the H₂O is in excess, therefore Mg is the limiting reagent

therefore 0.2 moles of Mg reacts with the 0.2 moles of H₂O, and forms 0.2 moles of MgO

$$\text{mass MgO} = M_r \times \text{moles} = 40 \times 0.2 = 8 \text{ g}$$

- 3 2.0 g of calcium is reacted with 0.32 g of oxygen. Work out which is the limiting reagent and then calculate the mass of calcium oxide formed.



$$\text{moles Ca} = \frac{\text{mass}}{M_r} = \frac{2.0}{40} = 0.05 \text{ mol}$$

$$\text{moles O}_2 = \frac{\text{mass}}{M_r} = \frac{0.32}{32} = 0.01 \text{ mol}$$

0.05 moles of Ca needs 0.025 moles of O₂ for all the Ca to react, but we don't have this much O₂

therefore O₂ is the limiting reagent (so the Ca is in excess and does not all react)

therefore only 0.02 moles of Ca reacts with the 0.01 moles of O₂, and forms 0.02 moles of CaO

$$\text{mass CaO} = M_r \times \text{moles} = 56 \times 0.02 = 1.12 \text{ g}$$