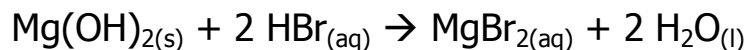


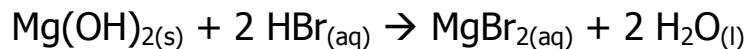
Consider the following equation:



- 1) What type of chemical reaction is taking place? _____
- 2) How many milliliters of 0.225 M HBr would be needed to react completely with 3.26 grams of magnesium hydroxide?
- 3) If 31.6 grams of magnesium hydroxide is combined with 68.0 mL of 0.725 M HBr, which is the limiting reagent? How many grams of magnesium bromide would be formed?
- 4) How many grams of the excess reagent will be left over after the reaction in part 3 is complete?

Solutions

Consider the following equation:



- 1) What type of chemical reaction is taking place? neutralization reaction
- 2) How many milliliters of 0.225 M HBr would be needed to react completely with 3.26 grams of magnesium hydroxide?

$$3.26 \text{ g Mg(OH)}_2 \times \frac{1 \text{ mole Mg(OH)}_2}{58.32 \text{ g Mg(OH)}_2} \times \frac{2 \text{ mole HBr}}{1 \text{ mole Mg(OH)}_2} \times \frac{1 \text{ L HBr}}{0.225 \text{ mole HBr}} \times \frac{1000 \text{ mL HBr}}{1 \text{ L HBr}} =$$
$$= 438 \text{ mL HBr}$$

- 3) If 31.6 grams of magnesium hydroxide is combined with 68.0 mL of 0.725 M HBr, which is the limiting reagent? How many grams of magnesium bromide would be formed?

$$31.6 \text{ g Mg(OH)}_2 \times \frac{1 \text{ mole Mg(OH)}_2}{58.32 \text{ g Mg(OH)}_2} = 0.54184 \text{ mole Mg(OH)}_2$$

$$68.0 \text{ mL HBr} \times \frac{1 \text{ L HBr}}{1000 \text{ mL HBr}} \times \frac{0.725 \text{ mole HBr}}{1 \text{ L HBr}} = 0.0493 \text{ mole HBr}$$

HBr is the limiting reagent.

$$0.0493 \text{ mole HBr} \times \frac{1 \text{ mole MgBr}_2}{2 \text{ mole HBr}} \times \frac{184.11 \text{ g MgBr}_2}{1 \text{ mole MgBr}_2} = 4.54 \text{ g MgBr}_2$$

- 4) How many grams of the excess reagent will be left over after the reaction in part 3 is complete?

$$0.0493 \text{ mole HBr} \times \frac{1 \text{ mole Mg(OH)}_2}{2 \text{ mole HBr}} \times \frac{58.32 \text{ g Mg(OH)}_2}{1 \text{ mole Mg(OH)}_2} = 1.44 \text{ g Mg(OH)}_2$$

$$31.6 \text{ g Mg(OH)}_2 - 1.44 \text{ g Mg(OH)}_2 = 30.2 \text{ g Mg(OH)}_2$$