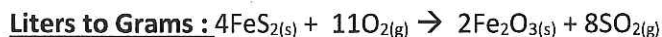


Stoichiometry Practice

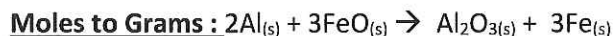


9. If 5 L of oxygen completely reacted how many grams of Fe_2O_3 would theoretically be made?

$$\frac{5 \text{ L O}_2}{22.4 \text{ L/mol}} = 0.2232 \text{ mol O}_2 \times \frac{2 \text{ mol Fe}_2\text{O}_3}{11 \text{ mol O}_2} = 0.0406 \text{ mol Fe}_2\text{O}_3 \times \frac{159.7 \text{ g}}{\text{mol}} = \boxed{6.48 \text{ g Fe}_2\text{O}_3}$$

10. 230 L of toxic SO_2 gas was recovered during a reaction, how many grams of FeS_2 did it take to produce it?

$$\frac{230 \text{ L SO}_2}{22.4 \text{ L/mol}} = 10.27 \text{ mol SO}_2 \times \frac{4 \text{ mol FeS}_2}{8 \text{ mol SO}_2} = 5.134 \text{ mol FeS}_2 \times \frac{119.97 \text{ g}}{\text{mol}} = \boxed{616 \text{ g FeS}_2}$$

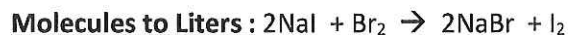


11. If 3.000 moles of Al reacted how many grams of Fe would we theoretically expect to be produced?

$$3.000 \text{ mol Al} \times \frac{3 \text{ mol Fe}}{2 \text{ mol Al}} = 4.5 \text{ mol Fe} \times \frac{55.85 \text{ g}}{\text{mol}} = \boxed{251 \text{ g Fe}}$$

12. If 5.0 moles of Al_2O_3 were recovered, how many grams of FeO did we start with?

$$5.0 \text{ mol Al}_2\text{O}_3 \times \frac{3 \text{ mol FeO}}{1 \text{ mol Al}_2\text{O}_3} = 15.0 \text{ mol FeO} \times \frac{71.85 \text{ g}}{\text{mol}} = \boxed{1078 \text{ g FeO}}$$



13. I need 3.47×10^{24} molecules of NaBr, how many liters of Bromine should I put into the reaction?

$$\frac{3.47 \text{ E } 24 \text{ molecules NaBr}}{6.02 \text{ E } 23 \text{ molecules/mol}} = 5.764 \text{ mol NaBr} \times \frac{1 \text{ mol Br}_2}{2 \text{ mol NaBr}} = 2.882 \text{ mol Br}_2 \times \frac{22.4 \text{ L/mol}}{\text{mol}} = \boxed{64.6 \text{ L Br}_2}$$

14. If 12.34×10^{30} molecules of NaI react, what volume container should we use to capture all of the Iodine produced?

$$\frac{12.34 \text{ E } 30 \text{ molecules NaI}}{6.02 \text{ E } 23 \text{ molecules/mol}} = 2.050 \text{ E } 7 \text{ mol NaI} \times \frac{1 \text{ mol I}_2}{2 \text{ mol NaI}} = 1.025 \text{ E } 7 \text{ mol I}_2 \times 22.4 \frac{\text{L}}{\text{mol}} = \boxed{2.30 \text{ E } 8 \text{ L I}_2}$$

Stoichiometry Practice

Grams to moles:

1. Convert 10.0 grams of H₂ to moles of H₂

$$\frac{10 \text{ g H}_2}{2.016 \text{ g/mol}} = \boxed{4.96 \text{ mol H}_2}$$

2. How many moles are in 21 grams H₂SO₄

$$\frac{21 \text{ g H}_2\text{SO}_4}{98.076 \text{ g/mol}} = \boxed{0.214 \text{ mol H}_2\text{SO}_4}$$

Grams to molecules:

3. A Balloon with 5 grams of CO₂ has how many molecules?

$$\frac{5 \text{ g CO}_2}{44.01 \text{ g/mol}} = 0.1136 \text{ mol CO}_2 \times 6.02 \times 10^{23} \frac{\text{molecules}}{\text{mol}} = \boxed{6.84 \times 10^{22} \text{ molecules CO}_2}$$

4. You exhale 3.7x10⁻² g of CO₂ with each breath, how many molecules is that?

$$\frac{3.7 \times 10^{-2} \text{ g CO}_2}{44.01 \text{ g/mol}} = 8.407 \times 10^{-4} \text{ mol CO}_2 \times 6.02 \times 10^{23} \frac{\text{molecules}}{\text{mol}} = \boxed{5.06 \times 10^{20} \text{ molecules CO}_2}$$

Grams to atoms:

5. You exhale 3.7x10⁻² g of CO₂ with each breath, How many atoms of C is that?

$$\frac{3.7 \times 10^{-2} \text{ g CO}_2}{44.01 \text{ g/mol}} = 8.407 \times 10^{-4} \text{ mol CO}_2 \times 6.02 \times 10^{23} \frac{\text{molecules}}{\text{mol}} = 5.06 \times 10^{20} \text{ molecules CO}_2 \times \frac{1 \text{ atom C}}{1 \text{ molecule CO}_2} = \boxed{5.06 \times 10^{20} \text{ atom C}}$$

6. How many atoms of O are in 20.00 g of Sulfuric acid (H₂SO₄)?

$$\frac{20.00 \text{ g H}_2\text{SO}_4}{98.076 \text{ g/mol}} = 0.2039 \text{ mol H}_2\text{SO}_4 \times 6.02 \times 10^{23} \frac{\text{molecules}}{\text{mol}} = 1.228 \times 10^{23} \text{ molecules H}_2\text{SO}_4 \times \frac{4 \text{ atom O}}{1 \text{ molecule H}_2\text{SO}_4} =$$

Grams to Grams: 4FeS_{2(s)} + 11O_{2(g)} → 2Fe₂O_{3(s)} + 8SO_{2(g)}

$$\boxed{4.91 \times 10^{23} \text{ atom O}}$$

7. Using the equation above, how many grams of Fe₂O₃ would be produced from 754 g of FeS₂ reacting completely?

$$\frac{754 \text{ g FeS}_2}{119.97 \text{ g/mol}} = 6.285 \text{ mol FeS}_2 \times \frac{2 \text{ mol Fe}_2\text{O}_3}{4 \text{ mol FeS}_2} = 3.142 \text{ mol Fe}_2\text{O}_3 \times 159.7 \frac{\text{g}}{\text{mol}} = \boxed{502 \text{ g Fe}_2\text{O}_3}$$

8. How many grams of Oxygen would be needed to completely react with 850 g FeS₂ according to the above equation?

$$\frac{850 \text{ g FeS}_2}{119.97 \text{ g/mol}} = 7.085 \text{ mol FeS}_2 \times \frac{11 \text{ mol O}_2}{4 \text{ mol FeS}_2} = 19.48 \text{ mol O}_2 \times 32.00 \frac{\text{g}}{\text{mol}} = \boxed{623 \text{ g O}_2}$$