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**ChemBridge: Extra Stoichiometry Practice**

1. At high temperatures, sulfur combines with iron to form the brown-black iron (II) sulfide:

Fe (s) + S (l) 🡪 FeS (s)

In one experiment, 7.62 g of Fe are allowed to react with 8.67 g of S.

1. What is the limiting reagent, and what is the reactant in excess?
2. Calculate the mass of FeS formed.
3. Calculate the percent yield for the reaction: P4 (s) + 6 Cl2 (g) → 4 PCl3 (l) if 75.0 g of phosphorus reacts with excess chlorine gas to produce 111.0 g of phosphorus trichloride.
4. Formic acid, HCHO2, burns in oxygen to form carbon dioxide and water as follows:

HCHO2 (aq) + O2 (g) → 2 CO2 (g) + 2 H2O (l).

If a 3.15-g sample of formic acid was burned in 2.0 L of oxygen, what volume of carbon dioxide would be produced? (Assume the reaction occurs at standard temperature and pressure, STP.)

1. Zinc metal reacts with hydrochloric acid to produce zinc chloride and hydrogen gas.
2. Balance the following reaction: Zn (s) + HCl (aq) → ZnCl2 (aq) + H2 (g)
3. A 3.50-g sample of zinc metal is allowed to react with 2.50 g of hydrochloric acid.

Complete the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Reactants/products | Zn (grams) | HCl (grams) | ZnCl2 (grams) | H2 (L) |
| Before reaction |  |  |  |  |
| After reaction | 1.26 g |  |  |  |

1. When iron (II) hydroxide is mixed with phosphoric acid, iron (II) phosphate precipitate results.
   1. Balance the following equation: Fe(OH)2 (aq) + H3PO4 (aq) → Fe3(PO4)2 (s) + H2O (l)
   2. If 3.20 g of Fe(OH)2 is treated with 2.50 g of phosphoric acid, what is the limiting reagent and what is the reactant in excess?
   3. How many grams of Fe3(PO4)2 precipitate can be formed?
   4. If 3.99 g of Fe3(PO4)2 is actually obtained, what is the percent yield?
   5. How much of the excess reactant will be left over?