1. Consider the following reaction.

$$Ca_3(PO_4)_2 \ (s) \ + \ H_2SO_4 \ (aq) \ \rightarrow \ CaSO_4(s) \ + \ H_3PO_4(aq)$$
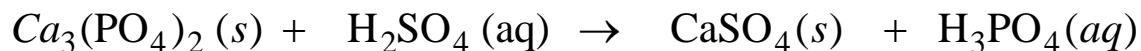
What masses of calcium sulfate and phosphoric acid (H_3PO_4) can be produced from the reaction of 1.00 kg of calcium phosphate with 1.00 kg of sulfuric acid?

2. Bornite (Cu_3FeS_3) is a copper ore used in the production of copper. When heated, the following reaction occurs.

$$2\,Cu_3FeS_3(s) \ + \ 7\,O_2 \ (g) \ \rightarrow \ 6\,Cu(s) \ + \ 2\,FeO\,(s) + \ 6\ SO_2(g)$$
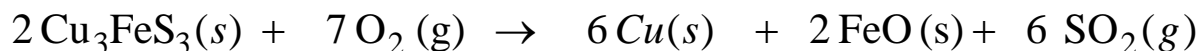
If 2.0 kg of bornite is reacted with excess oxygen gas, and the process has an 86.3% yield of copper, what mass of copper is produced?

3. Acrylonitrile (C_3H_3N) is the starting material for many synthetic carpets and fabrics. It is produced by the following reaction.

$$2\ C_3H_6(g) \ + \ 2\,NH_3 \ (g) \ + \ 3\,O_2 \ (g) \ \rightarrow \ 2\ C_3H_3N(g) \ + \ 6\,H_2O\,(g)$$

If you want to produce 250.0 kg of acylonitrile, how much of each of the starting materials will be needed (assuming 100% yield)?