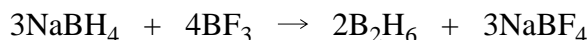


STOICHIOMETRY PROBLEM SET

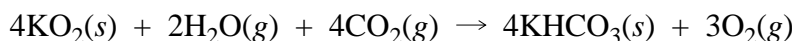
1. Calculate the number of grams of SF₄ that can be made from 4.00 g of SCl₂ and 2.00 g of NaF by the following reaction:



2. Calculate the theoretical yield (**in grams**) of B₂H₆ from the reaction of 25.0 g of 85.0% NaBH₄ with 54.0 g of BF₃. The reaction is:



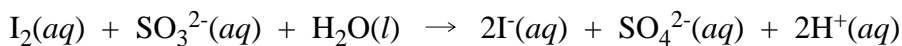
3. Calculate the percent purity of a sample of KO₂ if 3.30 g of the sample gave 655 mL of O₂ at STP by the reaction below. The volume of 1 mole of a gas at STP is 22.4 L.



4. When 1.00 mg of a mixture of cocaine, C₁₇H₂₁O₄N, and table sugar (sucrose), C₁₂H₂₂O₁₁, is burned, 1.75 mg of CO₂ are produced. Calculate the percent (**by mass**) of cocaine in the sample.

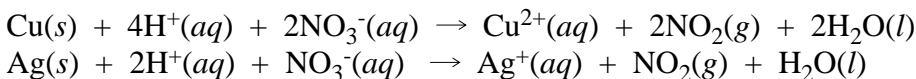
5. "Proof" of liquor is approximately twice the percent by volume of ethanol, C₂H₅OH. Calculate the **molarity** of 86 proof scotch. The density of pure ethanol is 0.79 g/mL.

6. A sample of hydrated sodium sulfite (Na₂SO₃·XH₂O) of mass 0.4322 g was dissolved in water and oxidized to sodium sulfate by adding exactly 0.8000 g of I₂ (present in excess) according to the net ionic equation shown below:



The resulting acidic solution was then exactly neutralized by the addition of 40.00 mL of 0.100 M NaOH. Determine the value of X in Na₂SO₃·XH₂O.

7. A 10.0 g sample of a Cu/Ag alloy reacted with concentrated HNO₃ according to the following equations:



A total of 10.00 g of NO₂ was isolated. Assuming a 100% yield of NO₂, determine the percent by mass of Ag in the alloy.