

## CHM 150/151: SOLUTION STOICHIOMETRY

- The active ingredient in *Milk of Magnesia*, a commonly used laxative, is magnesium hydroxide. A 2.0-teaspoon (10.0 mL) sample of *Milk of Magnesia* was analyzed and required 18.26 mL of a 1.50M hydrochloric acid for complete neutralization.
  - Write the balanced chemical equation for the reaction between hydrochloric acid and magnesium hydroxide.
  - Calculate the mass (in mg) of magnesium hydroxide present in the sample of *Milk of Magnesia*.
  - Calculate the mass percent concentration of magnesium hydroxide in *Milk of Magnesia* given that the density of *Milk of Magnesia* is 1.1 g/mL.
- Limestone is a mixture of calcium carbonate and other substances. A 1.356 g sample of limestone rock is pulverized then analyzed with a standard solution of hydrobromic acid. The sample required 25.87 mL of a 0.750M hydrobromic acid solution for complete neutralization to a phenolphthalein endpoint.
  - Write the balanced chemical equation for the reaction between hydrobromic acid and calcium carbonate.
  - Calculate the mass percent concentration of calcium carbonate in the limestone.
- The mass percentage of chloride ion in a sample of sea water can be determined by titrating the sample with silver nitrate, which produces a precipitate. In one test, a 25.0 mL sample of sea water was titrated with 39.47 mL of a 0.3029M silver nitrate solution to reach the equivalence point,
  - Write the balanced chemical equation for the reaction between silver nitrate and chloride ion.
  - Calculate the mass percentage of chloride ion in the sea water if the density of sea water is 1.03 g/mL.
- Oxalic acid,  $\text{H}_2\text{C}_2\text{O}_4$  (aq), is present in many plants and vegetables. If 24.0 mL of 0.0100M potassium permanganate solution is needed to titrate a 1.00 g sample that contains oxalic acid, what is the mass percent concentration of oxalic acid in the sample?

