

Experiment 8: Determining the Mass Percent Composition of an Aqueous Hydrogen Peroxide Solution

You will need to purchase the Signature Labs Series booklet from the bookstore for this experiment. Read module ANAL0378 (pp 15-23) before lab and prepare the pre-lab outline of the procedure as usual, incorporating the changes to the procedure discussed below (do *not* do the pre-laboratory assignment in the module). Use your lab notebook to record your data and observations, not the data sheet provided in the module.

(See Tro, Chapter 5.)

Modifications to the procedure

Work with a partner for this experiment.

- Clean the three 25x150 mm test tubes that are in your drawer, shake out any water and allow them to dry as much as possible.
- The dowels have already been marked.
17. Pour the water into the buret, *not* the leveling bulb. The meniscus should be between 0.00 and 0.50 mL.
- 19-24. Skip these steps. You will dispense approximately **2 mL** of the H₂O₂ solution from a 50 mL dispensing buret directly into a *clean* 25x150 mm test tube. Do not dispense *more* than 2 mL. Record the initial and final readings on the dispensing buret so you can calculate *exactly* how much solution you dispensed to the nearest 0.01 mL. Continue with Step 25.
30. During gas evolution, one student should grip the test tube in the palm of the hand while pressing down firmly on the two-hole stopper with the thumbs. Each time the water level drops by about **5 mL**, the other student should lower the leveling bulb so that the water levels in the bulb and buret are approximately aligned.
35. Your TA will tell you the barometric pressure for the day.

Record the density and the actual mass percent of the H₂O₂ solution in your notebook.

Calculations

Do all of the calculations asked for in the module on page 23. Note that in calculations 9 and 10, the volume of the solution was approximately 2 mL (use the precise amount that you recorded in your notebook), **not** 5.00 mL. Also, there should be absolute value bars around the numerator of the fraction in Equation 13 of the module (percent error).

Questions (do *not* answer the questions in the module)

1. Explain why it is essential that none of the yeast comes in contact with the H_2O_2 solution before the stopper is in place to completely close the system. What effect would this error have on the determination of the mass percent composition of H_2O_2 solution?
2. A student's thermometer was mis-calibrated such that it displayed a temperature that was higher than the actual temperature. This error would have two effects when doing the calculations to determine the mass percent of H_2O_2 . Describe each of these effects.
3. Discuss any errors that you may have made in the procedure and how they affected the determination of the concentration of the hydrogen peroxide solution.