

Dye Fading Kinetics

Version 03.1

Start up: The following steps should be taken before the experiment is started.

- 1) Look up and read the literature references from the problem statement.
- 2) Prepare a NaOH solution and phenolphthalein solution at the desired concentrations. (A 0.1 M solution of NaOH, and saturated phenolphthalein solution in ethanol has been prepared and should be available on the lab bench.)
- 3) Place about 1300 mL of NaOH solution into the reactor.
- 4) Turn on the main power for the stirrer. Start the stirrer. It should already be set to 90 rpm, the suggested speed. Set the bath to the desired temperature. It can take as long as 2 hours for the reactor to reach a constant temperature.
- 5) Turn on the computer connected to the spectrophotometer about 30 minutes before collecting data. This will power the spectrophotometer and allow it to warm up. (Remember to turn off this computer at the end of lab to protect the lamp of the spectrophotometer.)

Experiment: The following steps should be taken to assure correct collection of data.

- 1) Start the **Kinetics** software package. It can be found in the Cary WinUV folder on the desktop.
- 2) Press the Setup button located on the left of the screen.
 - a) Set wavelength to 550.0 nm. (This is the wavelength of light that phenolphthalein absorbs.)
 - b) Set run time. (Pick a time longer than you think the reaction needs to run. The process can be stopped if the reaction finishes.)
 - c) Set averaging time. (The spectrophotometer takes 80 readings each second. An averaging time of 1 second will average those 80 reading.)
 - d) Click ok.
- 3) Zero spectrophotometer.
- 4) Press Start. (Big button on top of screen.)
- 5) Name sample, and file. Saving to your USB drive.
- 6) Let the 2 minute countdown run out or press ok. Immediately add 5 or 6 drops of phenolphthalein solution (or enough to give an initial absorbance between 1.0 and 2.0).
- 7) When reaction is finished, press stop. (Big button on top of screen.)

8) Click on the file menu, select save as. Change file type to .csv. (This will allow you to see your data in a spreadsheet program.)

Shutdown: Follow these steps when turning off equipment.

- 1) Open the drain valve and empty the contents of the reactor into the "waste container" under the lab bench.
- 2) Flush the reactor with deionized water. These washings can be collected in the "reactor wash" container and disposed into the sink. (Note only the water from rinsing the reactor is to be dumped into the sanitary drains. The waste must be collected for proper disposal!)
- 3) Turn off the stirrer and temperature bath.
- 4) Shut down the computer. (This is especially important because the lamp of the spectrophotometer has a limited life and is on whenever the computer is on.)
- 5) Clean up your lab area.