

Colorado State University
CHEM 431
Instrumental Analysis Laboratory

Notes for
Simultaneous UV-Visible Spectroscopy and
Potentiometry of an Oscillation Reaction

It is a rare occurrence that we are faced with making a single measurement at a time. More often our work requires simultaneous measurement of multiple parameters (for comparison, correspondence or cross-check) while maintaining the system under study at just the right experimental conditions. Here is an experiment that requires the simultaneous time-dependent measurement of two non-trivial parameters and their subsequent synchronization. The following is a set of short notes to outline the experiment in question and to provide helpful guidance to those executing the experiment.

- A. Prepare a demonstration of the aqueous bromination of malonic acid catalyzed by cerium-ceric ion couple. Observe and record it visually. Demonstrate the requirement for continuous mixing of the reaction vessel. Do not waste precious reagents.
- B. Measure a set time-dependent UV-Visible spectra of the oscillating reaction that fully characterize the reaction at all times. Do not waste precious reagents.
- C. Prepare a potentiometric measurement of the same reaction using a platinum electrode and a silver-silver chloride electrode with an integral agar salt bridge. Determine and report on a suitable salt for the bridge.
- D. Make the two above measurements simultaneously and present a clear depiction of the results including a description and evidence of how the two measurements are successfully synchronized.