

STUDENT RESEARCH WEEK

POSTERS · TALKS CREATIVE WORK

Validation of the Cheapstat Potentiostat

Poster: Darren Berg

Bachelor of Science: Chemistry, MacEwan University

Faculty mentor: Dr. Orla Aaquist

Arts and Science: Physics, MacEwan University

Abstract

The future of chemical analysis is the development of highly integrated hand-held devices that can be used by non-experts, in non-lab settings. Coupled with abundant information on the Internet and large variety of available electronics, a small device for analytics could be fabricated and made available at an economical price. This would allow the public to determine many different contaminants in their environment with only a little know-how and the press of a button. A device that meets these requirements could be a potentiostat.

A potentiostat is a simple device that applies a voltage and measures current. Though simple in concept there are many different applications for such a device and it is the staple in electrochemistry. Potentiostats have many different applications in terms of analytes it can detect. For example, it could be used to determine the quantity of metals in water, glucose in blood, and antioxidants in food. Typically, commercial potentiostats can cost from \$1000 to \$25,000. Since these devices are expensive, a means of finding a cheaper alternative for public use is favourable. The CheapStat potentiostat is a device that meets this criteria. The Cheapstat is a do-it-yourself potentiostat that costs a little under \$100 and can be made with a slight proficiency in electronics.

We wish to recreate the Cheapstat and see if it can be used for electrochemistry. We will determine the difficulty of fabrication, practicality, and application of the device. We have also worked on developing a bio-sensor that can be used in conjunction with the Cheapstat to determine antioxidants in fruits. The knowledge we obtain from this project can be used in many forms of analytical research, and can assist in teaching electrochemistry to students.

Co-Authors: Orla Aaquist, and S.M. Mugo