

Inexpensive Mobile Cheapstat Sensor for Environmental, Food and Clinical Chemical Analysis

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Oral Presentation Abstract:

The chemical analysis can benefit from the development of integrated hand-held devices that can be used by non-experts, in non-lab settings to determine various contaminants in their environment. Coupled with abundant information on the Internet and a large variety of available electronics, such devices can be fabricated and made available at an economical price. The potentiostat, a staple in electrochemistry, is such a device under current investigation by the authors.

A potentiostat is a simple device that applies a voltage and measures current in response to electrochemical reactions from a specific contaminant under investigation. 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 cost from \$1000 to \$25,000. Since these devices are expensive, a means of finding a cheaper alternative for public use is beneficial. The CheapStat potentiostat is a device that meets these criteria. The Cheapstat is a do-it-yourself potentiostat that costs a little under \$100 and can be made with minimal proficiency in electronics.

We have assembled and tested the Cheapstat to determine its practicality and application for electrochemistry, and we have developed and tested bio-sensors that can be used in conjunction with the Cheapstat to determine antioxidants in fruits. The data we obtain from this project can be used in analytical research and assist in teaching electrochemistry to students.

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