

Technical Brief

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Portable, user-friendly, low cost electrochemical toy - LapPot

Technology Summary

A basic, easily fabricated low-cost potentiostat coupled with user-friendly software that makes it an effective tool to study electrochemistry in low resource centers such as an undergraduate laboratory.

Background

Although potentiostats are widely used in electrochemical research, they have seen little penetration in India's undergraduate laboratories. A basic potentiostat costs upwards of 1.5 lakh rupees, making it too expensive to be widely incorporated in an undergraduate curriculum, with instances of 100 students sharing one potentiostat even at premier institutions. Thus, there is a need for an inexpensive potentiostat that can be widely used in undergraduate laboratories, to help chemistry undergraduates develop good practical skills.

Technology description

CSIR-CSMCRI has developed a robust and portable electrochemical toy (LapPot) with the advantages of simple operation, low cost, and respectable precision and accuracy. The tailored electrochemical cell comprising the electrodes is made of plastic and not glass, contributing to the robustness of the device. Moreover, all connections from the cell to the LapPot are concealed and routed through a single USB connector between the cell and LapPot – thereby eliminating the need for conventional banana and crocodile clips. The reference electrode is a Ag/AgCl electrode, the working electrode is a low cost disposable plastic chip electrode also developed at CSMCRI, and the counter electrode is a stainless steel electrode. The user interface is very easy, keeping in mind the end user. The top panel on the device has four buttons that can be used to set experiment parameters such as scan rate.

Market Potential

There are 900 universities in India with 10,000 science colleges. Estimated product cost is Rs. 50,000, and if each college buys 3, the potential market size is 150 Cr. The global market will be much bigger, and the market size will increase with add-on accessories.

Value Proposition

- The portable, user friendly, robust design makes it ideal for teaching or education purposes.
- The portable electrochemical device can be easily carried from one classroom to another.
- The device will come with a manual containing 5-6 suggested experiments with theoretical background, principles, suggested observation parameters and more.
- The data from the Lap Pot can transferred easily to a PC / laptop for further analysis.

Applications

The LapPot can be used for the following experiments: Cyclic voltammetry, verification of Randles-Sevcik Equation, monitor electropolymerization reaction, electrometallurgy experiments using copper-zinc solutions, and more.

Technology status

Early version of the prototype ready. Filing patent under process.

