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Advanced Potentiostat

Tech ID: 33192 / UC Case 2022-811-0

BACKGROUND

During In the last few decades, the use of miniaturized electrochemical devices has grown rapidly and found diverse applications in scientific and consumer products. The process of developing specialized electrochemical devices is often time-consuming and expensive. Experimental setups involving electrochemistry often use specialized measurement equipment such as a potentiostat. A potentiostat is an analytical instrument that controls the voltage and current between two or more electrodes in a cell. The accuracy, precision, and flexibility of applying or measuring voltages and currents depends on the quality and design of the electronic hardware, which for commercially available potentiostats, often correlate with the device's cost and architecture. Consequently, one of the challenges faced by today's electrochemical research community is how to perform modern experimental designs with expensive, asynchronous, and inflexible potentiostats.

TECHNOLOGY DESCRIPTION

To help address this challenge, investigators at UC Santa Cruz (UCSC) have researched and developed a custom potentiostat for a variety of experimental applications. Their unique modular multi-channel potentiostat can operate multiple electrochemical devices or a single electrochemical device with more than one (e.g., working) electrode. It's also easy to scale (e.g., from 8 to at least 64 channels) by adding more stackable boards, and can be remotely or locally controlled. The architecture, including output and input stages, can be designed to achieve a wide output range, and low current measurement capability independently over multiple channels. In one configuration, the device provided multi-channel actuation with simultaneous current recording. In yet a further example, each of the (e.g., 64) parallel potentiostats had independently adjustable voltage sources ± 4 V and with maximum currents ± 1.5 μ A.

APPLICATIONS

- ▶ Research tooling
- ▶ Quality controls

ADVANTAGES

- ▶ Modular and parallel/multi-channel design
- ▶ Plug and play compatibility
- ▶ Scalable, currently from 8 to at least 64 channels
- ▶ Compatible with standard laboratory workflows

INTELLECTUAL PROPERTY INFORMATION

Country	Type	Number	Dated	Case
United States Of America	Published Application	20230194471	06/22/2023	2022-811

Additional Patent Pending

RELATED MATERIALS

- ▶ [Pansodtee, Pattawong, et al. "The multi-channel potentiostat: Development and evaluation of a scalable mini-potentiostat array for investigating electrochemical reaction mechanisms." Plos one 16.9 \(2021\): e0257167. - 09/16/2021](#)

CONTACT

Marc Oettinger
marc.oettinger@ucsc.edu
 tel: 831-502-0253.



OTHER INFORMATION

CATEGORIZED AS

- ▶ **Research Tools**
 - ▶ Other
- ▶ **Sensors & Instrumentation**
 - ▶ Analytical
 - ▶ Process Control
 - ▶ Scientific/Research
- ▶ **Engineering**
 - ▶ Other

RELATED CASES

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University of California, Santa Cruz

Industry Alliances & Technology Commercialization

Kerr 413 / IATC,

Santa Cruz, CA 95064

Tel: 831.459.5415

innovation@ucsc.edu

officeofresearch.ucsc.edu/

Fax: 831.459.1658

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