

New Guidelines for Presenting Electrochemical Data in All ACS Journals

Electrochemistry has become a cornerstone in many facets of modern chemistry research. The past few years have witnessed the rapid growth of research areas that employ electrochemical principles and methods, including batteries, supercapacitors, solar cells, fuel cells, electrolyzers, carbon dioxide reduction, nitrogen reduction, and organic electrosynthesis, to just name a few. As such, there has been an expansion in the number of papers reporting electrochemical testing and characterization. Publications reporting electrochemistry-related experiments have become prevalent in many ACS journals including, but not limited to, *ACS Applied Materials and Interfaces*, *ACS Catalysis*, *ACS Energy Letters*, *ACS Measurement Science Au*, *ACS Organic & Inorganic Au*, *Journal of the American Chemical Society*, *Organic Letters*, *The Journal of Organic Chemistry*, and *The Journal of Physical Chemistry*. There have been a variety of guidelines and checklists developed for some of the experimental protocols required for characterizing specific technologies (e.g., rotating ring disk electrochemistry measurements for oxygen reduction electrocatalysis and isotope experiments for nitrogen reduction to ammonia testing). However, no guidelines are available for the presentation of characterization data from general electrochemical measurements. This lack of standardization has resulted in papers being published with insufficient details for readers to reliably replicate the experiments. To outline best practices, we have developed a set of guidelines for reporting electrochemical experimentation and characterization in ACS journals. These guidelines, similar to the existing ACS guidelines for reporting NMR data and X-ray crystallography data for chemical compound and materials characterization, can be found on our [ACS Research Data Guidelines](#) website.¹ The guidelines for reporting electrochemical data are split into two sections: guidelines for reporting voltammetry and amperometry measurements, and guidelines for reporting bulk electrolysis procedures.

We developed this set of guidelines to be agnostic to the application, focusing on the information needed to reproduce the electrochemical data.¹ For instance, cyclic voltammetry is a common electroanalytical technique used in applications from biosensors to electrocatalysis to organic electrosynthesis; however, there are multiple notations used for cyclic voltammograms, as well as conditions and parameters such as the reference electrode (identity and concentration), working electrode (material and surface area), electrolyte (identity and concentration), method of IR correction, and scan rate. Likewise, bulk electrolyses are frequently carried out in energy and synthetic applications for the identification of

products and preparation of materials, and the various parameters important to the success of these experiments, including vessel design (volume, one-compartment vs two-compartment cell construction), electrodes, and type of electrolysis (constant current, potential, or cell voltage), should be detailed in a manner similar to how a procedure should be presented for organic synthesis or material fabrication. These guidelines for electrochemical data will enable the presentation of all necessary information to the reader so they can understand, reproduce, and reference reported procedures. We also emphasize the importance of providing all experimental conditions in figure captions and not just in Supporting Information/experimental sections.

We hope these new guidelines will support authors in the preparation of their electrochemical data for publication as they apply to all ACS journals, and help readers by making data clear, concise, and more readily reproducible. We are delighted to have these guidelines included in the [ACS Research Data Guidelines](#), which help all ACS journals offer the highest levels of rigor in the review and publication of scientific articles and research data.

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REFERENCES

- (1) Electrochemistry Data Guidelines, https://publish.acs.org/publish/data_guidelines#electrochemistry_data (retrieved on February 16, 2023).