

Accepted Manuscript

Designing spectroelectrochemical cells: A review

L. León, J.D. Mozo

PII: S0165-9936(17)30343-6

DOI: [10.1016/j.trac.2018.02.002](https://doi.org/10.1016/j.trac.2018.02.002)

Reference: TRAC 15097

To appear in: *Trends in Analytical Chemistry*

Received Date: 5 September 2017

Revised Date: 9 February 2018

Accepted Date: 9 February 2018

Please cite this article as: L. León, J.D. Mozo, Designing spectroelectrochemical cells: A review, *Trends in Analytical Chemistry* (2018), doi: 10.1016/j.trac.2018.02.002.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



DESIGNING SPECTROELECTROCHEMICAL CELLS: A REVIEW

L. León and J.D. Mozo

Laboratorio de Electroquímica Aplicada. Departamento de Ingeniería Química, Química Física y Ciencia de los Materiales. Facultad de Ciencias Experimentales, Universidad de Huelva. Avda. 3 de Marzo s/n (Campus El Carmen) ES-21071, Huelva, Spain.

Abstract A review on the recent state of spectroelectrochemical techniques is presented. Starting with a discussion of the advantages of the application of spectroelectrochemical techniques instead of an ex-situ combination of spectroscopic and electrochemical methods, the main part of this review is focused on two topics: practical considerations for obtaining the optimal conditions for spectroelectrochemical measurements according to the spectroscopic or electrochemical technique selected, and considerations for the optimal design and construction of spectroelectrochemical cells with examples. The final outlook is intended to the use of spectroelectrochemical detectors in flow injection analysis (FIA) experiments. More than 300 references are collected covering the main contributions on this subject.

Keywords spectroelectrochemistry; cell design; hyphenated techniques; flow cells; chemical detectors

1. INTRODUCTION

Electrochemistry is a pervasive scientific discipline, being essential for several generally relevant research subjects in Physics, Chemistry and Biology/Physiology, such as the transformation of materials, the transfer of information, and the conversion and storage of energy¹. In addition, electrochemical processes constitute a major class of chemical reactions both in the laboratory and on large industrial scale².

However, although there is a large number of electrochemical techniques^{3,4}, they can rarely unequivocally identify electroactive species⁵⁻⁷; the molecular identity of a new electrogenerated material is typically inferred from the measured physical properties of a known standard system. In addition, electrochemistry provides only limited and indirect information on structural changes accompanying redox events. This problem limits its application to explore complex electron transfer reactions⁸. In these cases, the information provided by the electrochemical techniques must be supplemented through

Download English Version:

<https://daneshyari.com/en/article/7687743>

Download Persian Version:

<https://daneshyari.com/article/7687743>

[Daneshyari.com](https://daneshyari.com)