

Available Technologies

Improved Spectroelectrochemical Cell and Method of Analysis

SUMMARY

Spectroelectrochemistry is potentially a widely applicable analytical technique. However, its use has been hampered in many applications by the inability to simultaneously conduct electrochemical detection with spectroscopic detection. In addition, current commercial spectroelectrochemical cells require relatively large amounts of sample (typically on the order of several milliliters) to be effectively used.

The new patent pending cell design and method developed by researchers at PNNL and University of Cincinnati inventors overcomes these limitations. It is capable of operating at sample volumes as small as a few microliters. The design of the cell is very simple and makes it easier to use than the cumbersome designs of current commercially available cells. It allows simultaneous electrochemical and spectroscopic analysis, thus facilitating throughput. Additionally, the cell set-up has been verified to determine electrochemical parameters (for example: redox potentials and diffusion coefficients) with remarkable accuracy, precision, and reproducibility. It is also envisioned that the set up can be used to study electrode reaction mechanisms.

It was specifically developed to meet the needs of analyzing liquid radioactive compounds where sample size is very limited due to radiation exposure issues and waste disposal difficulties. It should be readily applicable to the electrochemical and spectroelectrochemical detection, identification and characterization of any regulated sample or for samples where analyte quantities need to be kept small due to cost, availability, toxicity, or waste disposal issues.

ADVANTAGES

- * Applicable to virtually any cell sample size (from several milliliters to a few microliters)
- * Allows simultaneous electrochemical and spectroscopic analysis
- * Simple, effective design that provides ease of use
- * Provides for accurate, precise and reproducible determination of electrochemical and spectroelectrochemical parameters (e.g.: redox potentials and diffusion coefficients)

* Allows determination of electrode reaction mechanisms

Technology Portfolio(s)

» Other

Potential Industry Applications

» Chemicals

» Healthcare, Pharma, Biotech & Medical

» Professional Services

» Security

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