



APPLICATIONS OF ZMEs IN ELECTROANALYSIS OF ORGANICS

Ilie Vlaicu¹, Aniela Pop¹, Florica Manea^{2*}, Ciprian Radovan³, Georgeta Burtica²

¹S.C. Aquatim S.A., 11A Gheorghe Lazar Street, 300081 Timisoara, Romania

²"Politehnica" University of Timisoara, 2 Victoriei Square, 300006 Timisoara, Romania

³West University of Timisoara, 16 Pestalozzi Street, 300115 Timisoara, Romania

Abstract

In this paper, the role of Ag/Cu-modified zeolite in order to improve the electroanalytical performances of zeolite-modified electrodes (ZMEs) to detect organic pollutants is discussed. Two types of ZMEs, i.e., Ag/Cu-modified zeolite-expanded graphite-epoxy composite electrodes are discussed in comparison with expanded graphite-epoxy composite electrode. Function of the electroactivity of target species, two major characteristics of the zeolite was exploited, e.g., sorption capacity and catalytic properties of Cu/Ag-modified zeolite. Thus, for the electrochemical determination of 4-chlorophenol, the sensitivity was improved by applying a preconcentration step before electrochemical quantification. Ag-modified zeolite-expanded graphite-composite electrode exhibited both the electrocatalytic and preconcentration effect toward urea oxidation that led to its determination in aqueous solution, and Cu-modified zeolite-expanded graphite-composite electrode allowed the electrochemical determination of glucose. These modified electrodes impart both catalytic properties to the electrode surface for the electrooxidation of organics and/or selective sorption capacity to preconcentrate the target analyte prior its sensitive electrochemical detection.

Key words: 4-chlorophenol, electrochemical determination, glucose, urea, zeolite-modified composite electrode

Received: April, 2010; *Revised final:* May 2010; *Accepted:* May, 2010

* Author to whom all correspondence should be addressed: e-mail: florica.manea@chim.upt.ro; Phone: +40256-403-071; Fax: +40256-403-069