

Accepted Manuscript

Electrochemical behavior of polycrystalline gold electrode modified by thiolated calix[4]arene and undecanethiol

Vojtěch Hrdlička, Tomáš Navrátil, Jiří Barek, Jiří Ludvík



PII: S1572-6657(18)30071-7
DOI: <https://doi.org/10.1016/j.jelechem.2018.01.055>
Reference: JEAC 3846
To appear in: *Journal of Electroanalytical Chemistry*
Received date: 1 November 2017
Revised date: 29 January 2018
Accepted date: 30 January 2018

Please cite this article as: Vojtěch Hrdlička, Tomáš Navrátil, Jiří Barek, Jiří Ludvík, Electrochemical behavior of polycrystalline gold electrode modified by thiolated calix[4]arene and undecanethiol. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. *Jeac*(2017), <https://doi.org/10.1016/j.jelechem.2018.01.055>

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.

Electrochemical behavior of polycrystalline gold electrode modified by thiolated calix[4]arene and undecanethiol

Vojtěch Hrdlička^{a, b}, Tomáš Navrátil^{a, *}, Jiří Barek^b and Jiří Ludvík^a

^a *J. Heyrovský Institute of Physical Chemistry of the Czech Academy of Sciences, Dolejškova 3, 182 23 Prague 8, Czech Republic*

^b *Charles University, Faculty of Science, University Research Centre UNCE „Supramolecular Chemistry“, Department of Analytical Chemistry, UNESCO Laboratory of Environmental Electrochemistry, Albertov 6, CZ-128 43 Prague 2, Czech Republic*

Abstract

The electrochemical behavior of polycrystalline gold electrode (PAuE) modified by self-assembled monolayers (SAMs) of thiolated calix[4]arene (C4A) and undecanethiol (C11) was investigated by voltammetric methods and electrochemical impedance spectroscopy.

Coverage of the thiol SAMs and their stability was tested. The C11 layer is very stable; the desorption peak was recorded only in basic solutions of pH 12 and higher (at -1.30 V vs. Ag|AgCl (3 mol L⁻¹ KCl)).

The position of the C4A desorption peak is more pH dependent and it was recorded at -1.08 V at pH 13. Molecular coverage for C4A and C11 SAMs modified PAuE is 364 ± 52.9 $\mu\text{C cm}^{-2}$ and 137 ± 20.0 $\mu\text{C cm}^{-2}$ respectively.

The properties of the PAuE modified by C11 and/or C4A were investigated using the model compounds hydroquinone, ferrocene and potassium ferrocyanide. It is assumed that the oxidation of the hydroquinone cannot be realized inside the C4A cavity because the hydroquinone molecule is too big to enter the cavity. Similar behavior was observed using potassium ferrocyanide.

In contrast, cyclic voltammograms of ferrocene oxidation were only negligibly affected by the electrode modification. Moreover, capacitance measurements proved accumulation of ferrocenium ions at the C4A modified electrode.

* Corresponding author at: J. Heyrovský Institute of Physical Chemistry of the Czech Academy of Sciences, Dolejškova 3, 182 23 Prague 8, Czech Republic
E-mail address: Tomas.Navratil@jh-inst.cas.cz (T. Navrátil)

Download English Version:

<https://daneshyari.com/en/article/6661633>

Download Persian Version:

<https://daneshyari.com/article/6661633>

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