Analysis of a nanofilm of the mercaptophenyl diazonium modified gold electrode within new statistical parameters

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Abstract

The main aim of this study is to characterize the nanosurface of the mercaptophenyl diazonium modified gold (Au) surface by a new statistical approach. In this study the gold electrode surfaces were self-assembled in ethyl alcohol by 1.0 mM mercaptophenyl diazonium. FT-IR spectra of the surface modifier molecules in both solid and nanofilm of mercaptophenyl diazonium (MCP-Au) forms were recorded in the spectral range of 600-4,000 cm-1. The FT-IR spectra of solid mercaptophenyl diazonium tetrafluoroborate salt were obtained by using KBr pellets. The above FT-IR spectra of both bare Au and its nanofilm of mercaptophenyl diazonium were processed by new statistical approach to reach optimal smoothing trend for the characterization of the modified electrode surface consisting of the nanofilm of gold-mercaptophenyl diazonium. In the frame of new statistical approach all measured spectra have been 'read' in terms of a set of universal statistical parameters. These new parameters help to establish the statistical proximity of the smoothed spectra compared and give a possibility to classify the measured spectra in accordance with new set of statistical and robust quantitative values. Besides, there is a possibility to receive the relative fluctuations and the smoothed spectra of the second order. So, thanks to new approach we do not loose any measured information: the smoothed spectra and accompanied them noise (relative fluctuations) can be analyzed separately for detection of possible influence of predominant external factors that can be essential for this type of measurements. Copyright © 2010 American Scientific Publishers All rights reserved.

Keywords

Generalized mean value, Nanofilm of gold-mercaptophenyl diazonium, Optimal linear smoothing procedure