THE PREPARATION OF THE NEW GOLD SURFACE BASED ON THE FORMATION OF SELF ASSEMBLED MONOLAYER

Tugce Gover1, Yasemin Oztekin2,3, Zafer Yazicigil2

1 Hitt University, Faculty of Art and Science, Department of Chemistry, Corum, Turkey
2 Selcuk University, Faculty of Science, Department of Chemistry, Konya, Turkey
3 Vilnius University, Faculty of Chemistry, Center of Nanotechnology and Material Science, Vilnius, Lithuania
E-mail: tugcegover@gmail.com; yoztekin@gmail.com; zyazicigil@gmail.com

Nanotechnology has recently become one of the most exciting forefront fields in analytical chemistry. Especially in recent years it is rapidly forming new areas for the combination of electrochemical sensors in order to resolve challenging analytical, medical and environmental problems, including specificity, stability and sensitivity [1].

Among these techniques applied for the preparation of new surfaces in sensor design, increasing attention has been paid to the application of self-assembled monolayers (SAMs) due to their simplicity of preparation, versatility, stability and reproducibility [2,3]. For this reason, SAM-modified electrodes have found potential applications in analytical chemistry, biosensors, corrosion, inhibition, wetting control and other biomolecular electronic devices [4, 5, 6]. Till now several studies have been performed with any kind of thiol, disulphide, amine or silane derivatives since the SAM-based technology provides a simple method for the surface functionalization by strong chemisorption of “anchor” groups. However, due to our knowledge, there is still no reported work on 6-(ferrocenyl)hexanethiol as a ferrocene derivative on gold electrode surface.

From the point of this view, in this study, the fabrication of a new kind of chemically modified electrode by potential cycling was performed. For this aim, 1.0×10⁻³ mM solution of 6-(ferrocenyl)hexanethiol was prepared in acetonitrile containing 0.1 M Tetrabutylammonium tetrafluoroborate. Pt wire, Ag/Ag⁺/AgNO₃ and Gold electrodes were used as counter, reference and working electrode, respectively. The surface preparation was performed in the potential range between -0.2 and +0.5 V at the scan rate of 100 mV/s. The new surface was characterized and the differences between bare and modified gold surface were clarified. Due to preliminary results of electrochemical measurements it is believed that the application of this surface will be possible in our forthcoming studies.

References