

Dopamine Sensor Based on a Composite of Silver Nanoparticles Implemented in the Electroactive Matrix of Calixarenes

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Abstract

A sensitive electrochemical sensor based on a composite containing silver nanoparticles and a redox active thiacalixarene with catechol fragments in the substituents at the lower rim has been developed and used for dopamine detection. The electrochemical investigation of thiacalixarene in homogeneous solution and on the electrode interface showed the reversible character of the redox conversion of catechol fragments and its involvement in the chemical reduction of silver which resulted in formation of uniform nanoparticles of 4-6nm in diameter. The use of such a material for electrode modification made it possible to record a high amplitude cathodic signal at -700mV that was proportional to the dopamine concentration within 1nM-1μM. (limit of detection 0.5nM). © 2011 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.

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Keywords

Amperometric sensor, Dopamine detection, Silver nanoparticles, Thiacalixarene