Thulium (III) Hexacyanoferrate Star Fruit-Like Structure Modified Electrode for L-Cysteine Electrochemical Sensor

Mani Sakthivel, Mani Sivakumar, Shen-Ming Chen^{*}, Wei Lun-Cheng

Electroanalysis and Bioelectrochemistry Lab, Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, Taipei 10608, Taiwan.

^{*}E-mail: smchen78@ms15.hinet.net

doi: 10.20964/2016.09.09

Received: 26 May 2016 / Accepted: 5 July 2016 / Published: 7 August 2016

We report the preparation of star fruit-like thulium hexacyanoferrate (TmHCF) by using one-step electrochemical deposition in cyclic voltammetry technique. The electrochemically deposited star fruit-like TmHCF is exhibit unique electrocatalytic activity towards the detection of L-cysteine (L-Cys). The as-prepared TmHCF was characterized using different techniques such as scanning electron microscopy (SEM), X-ray diffraction (XRD), electrochemical impedance spectroscopy (EIS). The electrochemical activity of star fruit-like TmHCF was studied using cyclic voltammetry (CV), and differential pulse voltammetry (DPV). The modified electrode shows a considerable linear range, sensitivity and detection limit of about 0.5 to 8.92 μM , 48.479 $\mu\text{A } \mu\text{M}^{-1} \text{cm}^{-2}$ and 16 nM respectively. Furthermore, the modified electrode was tested in the real samples analysis in urine and river water samples.

Keywords: Thulium hexacyanoferrate (TmHCF), electrochemical sensor, L-cysteine.

[FULL TEXT](#)

© 2016 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).