



Document details - Designing novel perovskite-type strontium stannate (SrSnO₃) and its potential as an electrode material for the enhanced sensing of anti-inflammatory drug mesalamine in biological samples

1 of 1

[Export](#) [Download](#) [More... >](#)

New Journal of Chemistry
Volume 43, Issue 31, 2019, Pages 12264-12274

Designing novel perovskite-type strontium stannate (SrSnO₃) and its potential as an electrode material for the enhanced sensing of anti-inflammatory drug mesalamine in biological samples(Article)

Muthukutty, B., Karthik, R., Chen, S.-M., Abinaya, M.

^aElectroanalysis and Bioelectrochemistry Lab, Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, No. 1, Section 3, Chung-Hsiao East Road, Taipei, 106, Taiwan

^bDepartment of Chemistry, VHNSN College (Autonomous), Virudhunagar, TN, India

Abstract

The enhanced electrocatalytic activity of an electrode developed with a perovskite-type inorganic material is witnessed very often because of its unique properties. In this view, we synthesized a new perovskite-type sphere-like strontium stannate (SrSnO₃) material by a simple co-precipitation method with the assistance of urea, and it was utilized as an electrocatalyst for the electrochemical sensing of anti-inflammatory drug mesalamine (MES). Furthermore, the synthesized SrSnO₃ was systematically characterized by FE-SEM, EDX mapping, XRD, Raman spectroscopy, and XPS. The electrochemical properties of the synthesized SrSnO₃ were examined by using cyclic voltammetry and differential pulse voltammetry techniques; these techniques indicated that SrSnO₃ exhibited better electrochemical oxidation of MES when compared with previously reported catalysts. The SrSnO₃-modified glassy carbon electrode (GCE) showed a higher peak current response with a lower detection potential towards sensing MES when compared to unmodified GCE with a broader linear response range (0.01-212 μM), lower detection limit (0.002 μM), and higher sensitivity. Moreover, the modified electrode demonstrated better repeatability, reproducibility, stability, and selectivity even in the presence of potentially interfering compounds such as common inorganic and biological species, which did not disturb the oxidation signal of MES. Furthermore, real sample analysis was performed to investigate the practical feasibility of the synthesized SrSnO₃ in human urine, lake water and commercial MES drug samples with satisfactory recovery results. The reported sensor system provides an operative measure for sensing a very low MES content with high selectivity in real sample analysis. © The Royal Society of Chemistry and the Centre National de la Recherche Scientifique 2019.

Indexed keywords

EMTREE drug terms:

carbon lake water mesalazine perovskite strontium strontium stannate unclassified drug

EMTREE medical terms:

Article catalyst cyclic potentiometry differential pulse voltammetry field emission scanning electron microscopy human lake limit of detection oxidation pH precipitation priority journal Raman spectroscopy synthesis X ray diffraction X ray photoemission spectroscopy

Chemicals and CAS Registry Numbers:

carbon, 7440-44-0; mesalazine, 89-57-6; perovskite, 12194-71-7, 61027-03-0; strontium, 7440-24-6

Cited by 27 documents

Niu, X. , Yang, J. , Ma, J.-F. NiS/Ni₃S₄ Nanoparticles in a N, S Co-Doped Carbon Matrix for Electrochemical Analysis of Mesalazine in Drug and Biological Samples

(2024) *ACS Applied Nano Materials*

Crapnell, R.D. , Adarakatti, P.S. , Banks, C.E.

Electroanalytical Overview: The Sensing of Mesalamine (5-Aminosalicylic Acid)

(2024) *ACS Measurement Science Au*

Jatiya, M. , Yadav, V. , Kumar, U.

Structural, microstructure, dielectric relaxation, and AC conduction studies of perovskite SrSnO₃ and Ruddlesden-Popper oxide Sr₂SnO₄

(2024) *Physical Chemistry Chemical Physics*

[View details of all 27 citations](#)

Inform me when this document is cited in Scopus:

[Set citation alert >](#)

[Set citation feed >](#)

Related documents

Find more related documents in Scopus based on:

[Authors >](#) [Keywords >](#)

SciVal Topic Prominence

Topic:

Prominence percentile:



ISSN: 11440546
CODEN: NJCHE
Source Type: Journal
Original language: English

DOI: 10.1039/c9nj02197c
Document Type: Article
Publisher: Royal Society of Chemistry

Chen, S.-M.; Electroanalysis and Bioelectrochemistry Lab, Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, No. 1, Section 3, Chung-Hsiao East Road, Taipei, Taiwan;
© Copyright 2020 Elsevier B.V., All rights reserved.