





# Document details - Rational design and facile synthesis of binary metal sulfides $VS_2-SnS_2$ hybrid with functionalized multiwalled carbon nanotube for the selective detection of neurotransmitter dopamine

1 of 1

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

Analytica Chimica Acta
Volume 1071, 13 September 2019, Pages 98-108

## Rational design and facile synthesis of binary metal sulfides $VS_2-SnS_2$ hybrid with functionalized multiwalled carbon nanotube for the selective detection of neurotransmitter dopamine(Article)

Sakthivel, R., Kubendhiran, S., Chen, S.-M., Kumar, J.V.

<sup>a</sup>Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, Taipei 106, Taiwan<sup>b</sup>Department of Chemical Engineering, National Taiwan University, Taiwan<sup>c</sup>Department of Chemistry, VHNSN College, Virudhunagar, Tamil Nadu 626001, India

View additional affiliations

### Abstract

In this work, we report a sensitive and selective electrochemical sensor for the detection of dopamine (DA) neurotransmitter based on  $VS_2-SnS_2/f-MWCNT$  hybrids. Herein, the binary metal sulfide ( $VS_2-SnS_2$ ) was synthesized via single step hydrothermal route and hybrids with f-MWCNT via the ultrasonication process. The as-prepared  $VS_2-SnS_2/f-MWCNT$  hybrids were characterized through the FESEM, EDX and elemental mapping, TEM, XPS, Raman and XRD techniques. The electrochemical performance and catalytic activity of the modified electrodes were probed using electrochemical impedance spectra (EIS), cyclic voltammetry (CV) and differential pulse voltammetry (DPV). Interestingly, DPV results exhibits an appreciable linear range from 0.025 to 1017  $\mu M$  and LOD of 0.008  $\mu M$ . The selectivity study was performed to prove the high selectivity of the  $VS_2-SnS_2/f-MWCNT$  hybrids modified electrode. Furthermore, the practical applicability of the DA sensor was scrutinized in human serum sample and rat brain sample. © 2019 Elsevier B.V.

### Author keywords

Binary metal sulfides Dopamine Functionalized multiwalled carbon nanotube Hydrothermal synthesis Vanadium disulfide

### Indexed keywords

Engineering controlled terms:

Amines Carbon disulfide Catalyst activity Cyclic voltammetry Electrochemical electrodes Electrochemical sensors Hydrothermal synthesis IV-VI semiconductors Nanotubes Neurophysiology Semiconducting tin compounds Tin compounds Vanadium compounds Yarn

Engineering uncontrolled terms

Binary metals Differential pulse voltammetry Dopamine Electrochemical impedance spectra Electrochemical performance Functionalized multi-walled carbon nanotubes Hydrothermal routes Vanadium disulfides

Engineering main heading:

Multiwalled carbon nanotubes (MWCN)

Cited by 49 documents

Özdemir, N. , Karslıoğlu, B. , Bankoğlu Yola, B.

A Novel Molecularly Imprinted Quartz Crystal Microbalance Sensor Based on Erbium Molybdate Incorporating Sulfur-Doped Graphitic Carbon Nitride for Dimethoate Determination in Apple Juice Samples

(2024) *Foods*

Zhao, Z. , Zheng, L.

Cobalt-generated reactive oxygen species promoted  $FeS_2/CoS_2$  for electrochemical detection of acetaminophen with the widest linear range and simultaneous detection of dopamine(2024) *Journal of Electroanalytical Chemistry*

Santhy, A. , Rejithamol, R. , Chandana, R.

Electrochemical sensor applications of mechanically alloyed materials

(2024) *Advancements in Powder Metallurgy: Processing, Applications, and Properties*

View details of all 49 citations

Inform me when this document is cited in Scopus:

Set citation alert &gt;

Set citation feed &gt;

### Related documents

Find more related documents in Scopus based on:

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

SciVal Topic Prominence

Topic:

## EMTREE drug terms:

dopamine multi walled nanotube sulfide tin tin sulfide unclassified drug  
 vanadium derivative vanadium sulfide  
 agents interacting with transmitter, hormone or drug receptors carbon nanotube dopamine  
 sulfide tin tin derivative tin sulfide vanadium vanadium derivative  
 vanadium disulfide

## EMTREE medical terms:

animal tissue Article catalysis chemical analysis chemical structure controlled study  
 cyclic potentiometry differential pulse voltammetry electrochemistry elemental analysis  
 human impedance spectroscopy limit of detection nonhuman pH priority journal  
 Raman spectrometry rat surface property synthesis transmission electron microscopy  
 ultrasound assisted extraction X ray diffraction X ray photoemission spectroscopy animal  
 blood brain chemistry chemistry devices electrochemical analysis electrode  
 procedures reproducibility synthesis

## MeSH:

Animals Brain Chemistry Dopamine Electrochemical Techniques Electrodes Humans  
 Hydrogen-Ion Concentration Limit of Detection Nanotubes, Carbon Neurotransmitter Agents  
 Rats Reproducibility of Results Sulfides Tin Tin Compounds Vanadium  
 Vanadium Compounds

## Chemicals and CAS Registry Numbers:

dopamine, 51-61-6, 62-31-7; sulfide, 18496-25-8; tin, 14314-35-3, 7440-31-5; vanadium, 7440-62-2;

Dopamine; Nanotubes, Carbon; Neurotransmitter Agents; Sulfides; Tin; Tin Compounds; tin sulfide; Vanadium; Vanadium Compounds; vanadium disulfide

## Funding details

Funding sponsor	Funding number	Acronym
Ministry of Science and Technology, Taiwan	107-2113-M- 027-005-MY3	MOST
Ministerio de Ciencia y Tecnología		MICYT

## Funding text #1

This project was supported by the Ministry of Science and Technology ( MOST 107-2113-M- 027-005-MY3 ), Taiwan, ROC.

## Funding text #2

This project was supported by the Ministry of Science and Technology (MOST 107-2113-M- 027-005-MY3), Taiwan, ROC.

ISSN: 00032670

CODEN: ACACA

Source Type: Journal

Original language: English

DOI: 10.1016/j.aca.2019.04.058

PubMed ID: 31128761

Document Type: Article

Publisher: Elsevier B.V.

Chen, S.-M.; Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, Taipei, Taiwan;

© Copyright 2019 Elsevier B.V., All rights reserved.