LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel)	**:**	Simple method for making MWCNTs/Au-NPs-based biosensorelectrodes		
Nama/ JumlahPenulis	**:**	5 Orang		
Status Pengusul	**:**	~~Penulis pertama~~/ Penuliske 3 / ~~PenulisKorespondesi~~**		
Identitas Jurnal Ilmiah	**:**	a. Nama Jurnal	:	Materials Research Express
		b. Nomor ISSN	:	2053-1591
		c. Vol, No., BlnThn	:	Vol 9, January 2022
		d. Penerbit	:	IOP Publishing Ltd
		e. DOI artikel (jikaada)	:	10.1088/2053-1591/ac4b75
		f. Alamat web jurnal	:	https://iopscience.iop.org/journal/2053-1591
		Alamat Artikel	:	https://iopscience.iop.org/article/10.1088/2053-1591/ac4b75
		g. Terindex	:	Scopus

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Semarang, 4 Maret 2022
Reviewer 1

Prof. Dr. Drs. RahmatGernowo, M.Si.
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Bidang Ilmu:FakultasSains dan Matematika

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d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12			11,9
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2. **<u>Ruang lingkup dan kedalaman pembahasan:</u>**
   Paper ini membahas tentang karakteristik tabung nano karbon berdinding untuk pengembangan biosensor yang mengintegrasikan multiwalled carbon nanotubes (MWCNTs) dengan Au nanopartikel (Au-NPs) untuk mendapatkan beberapa sifat unggul baru.
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Dr. Eng. Eko Hidayanto, S.Si., M.Si.
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Simple method for making MWCNTs/Au-NPs-based biosensor electrodes

Subagio A. , Taufiq H.R., Khumaeni A., Umiati N.A.K., Adi K.

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Abstract

Multiwalled carbon nanotubes have great potential when applied as biosensors. Their properties, especially as electrodes with electrochemical characteristics, offer strong benefits for developing biosensors. This research has been able to integrate multiwalled carbon nanotubes (MWCNTs) with Au nanoparticles (Au-NPs) to obtain several new superior properties. Cysteaminium chloride is used to link MWCNTs and Au-NPs while binding to specific antibodies to make them more sensitive to some diseases or viruses. The data on the success of the bonding of MWCNTs/Au-NPs were tested using three characterizations, namely FTIR, SEM, and XRD. Based on the results of testing electrochemical properties using the CV and EIS tests, the capacitance value of 6,363 Fg-1 and the Rct value of 717,9 Ω, respectively. This demonstrates good adhesion and electron transfer properties from the electrolyte to the probe and electrode. © 2022 The Author(s). Published by IOP Publishing Ltd.

Author keywords

Au-NPs; biosensor; electrodes; MWCNTs; screen printed

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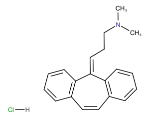

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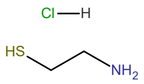

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Dr Yi Cao received his bachelor's degree in 2001 and Master's degree (Supervisor: Prof. Xiqun Jiang) in 2004 from Nanjing University. He then obtained his PhD in 2009 from the University of British Columbia (Supervisor: Prof. Hongbin Li). After a one-year postdoc at the same place, he started his independent career at the Department of Physics, Nanjing University as a full professor in 2010. His work was recognized by several awards including the 2014 IUPAP Young Scientist Prize in Biological Physics, the 2018 Young Innovator Award in Nanobiotechnology by Nano Research, and the 2019 Young Scientist Award from the Biomedical Polymer Materials Division of the Chinese Society for Biomaterials.

Judy Wu, University of Kansas, USA

Dr Judy Wu is a Distinguished Professor of Physics at the University of Kansas. She received her PhD from the University of Houston. She is an experimental condensed matter physicist and is specialized in fabrication, characterization and device applications of thin films and nanostructures. Her current research focuses on understanding the interfaces in ultrathin metal-insulator-metal tunnel junctions including Josephson tunnel junctions, magnetic tunnel junctions, memristors for quantum and neuromorphic computing, and in graphene-based heterostructures nanohybrids quantum sensors including photodetectors, strain/bio/gas/chemical sensors.

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TOPICAL REVIEW

Research status and development trend of ceramifiable silicone rubber composites: a brief review

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Keywords: reaction mechanism, silicone rubber, properties, ceramifiable silicone rubber composites;

Abstract

Ceramifiable silicone rubber composites (CSR) are one of the most important industrially produced elastic technical materials. At present, there is a strong demand for CSR in the high-tech fields of high-speed rail, nuclear power, rocket and aerospace, which are still to be met. Many scholars have committed to the research work of improving the thermal stability, flame retardant, mechanical properties by changing the silicone rubber (SR) matrixes and filler, tremendous advances in CSR have been made for over the last decades where CSR intended for the high technology fields has evolved through different generations. In summary, the first-generation research is based on matrix reaction, the second-generation research is on reaction products, and the third-generation research is on fillers effects. In this review, the evolution of CSR and the synthesis routes, reaction mechanism, and degradation mechanism are introduced and analyzed; fillers, various types of CSR based composites as well as the flame retardancy and mechanical properties are reviewed. Finally, the problems of developing high-performance CSRs are proposed and discussed. This review provides a theoretical basis and supporting data for the application of high-performance CSR, as well as provides details on the fire prevention mechanism of CSR.

1. Introduction

New polymer materials have been developed at a high speed, while the fires become increasingly complicated, causing larger explosion and damage due to the resulting fire, which is difficult to extinguish. Especially, fire resulting from electrical equipment can cause financial and property losses and injuries may occur. With the development of science and technology, high-power electromechanical equipment has become increasingly common. Use of electrical equipment increases the risk of fire. Therefore, to keep the fire from spreading, flame-retardant materials are required. Magnesium oxide mineral insulation, mica powder [1], and other refractory materials are applied to the fire retardant wires and electrical fields to improve the fire resistance grade of wire. However, traditional materials are difficult to produce; the production process is complicated and expensive. The yield can only partly meet the needs of the high-tech fields. CSR is a type of polymer-refractory material. It is applied in the fields of decoration, safety cables, aerospace, and other fields owing to its safety, flame retardancy, low smoke, and nontoxicity. The application of CSR in these fields provides a new method for fire prevention. Compared with the traditional fire-retardant materials, CRS has excellent mechanical properties and corrosion resistance at room temperature, ensuring work and operation in a normal temperature environment. When a fire occurs, the temperature increases. CSR protects equipment from fire owing to the high strength of ceramic body [2, 3]. The ceramic body will not melt and drop in the fire environment, which acts as a safety feature that ensures power transmission in the case of a fire breakout and provides time for fire rescue.

The concept of polymer-ceramic composites was proposed by Professor Hanu [4], who found that the liquid phase spread into the surrounding matrix and the eutectic liquid phase penetrates into the SR matrix region as temperature and exposure time increases. Prof. Hanu *et al* [4] reported that when the firing temperature

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PAPER

Green synthesis of Zinc sulphide (ZnS) nanostructures using *S. frutescences* plant extract for photocatalytic degradation of dyes and antibiotics

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Keywords: Zinc Sulphide nanoparticles, dyes, pharmaceuticals, green synthesis

Supplementary material for this article is available online

Abstract

Pollutants such as dyes and pharmaceuticals have become a problem in the environment, thus there is a need to find multifunctional materials that are safe and can be used for the removal of various pollutants. In this study, we report on the synthesis of Zinc sulphide (ZnS) nanostructures and their use as photocatalysts for the degradation of dyes and various antibiotics. Fourier transform infrared spectroscopy (FTIR) confirmed the functional groups found in plants and these were linked to the biomolecules identified through Liquid chromatography-mass spectrometry (LCMS). Ultraviolet-visible spectroscopy (UV–vis) and x-ray diffraction (XRD) confirmed the formation of the ZnS nanostructures. Thermal Gravimetric Analysis (TGA) and Brunner Emmet Teller (BET) confirmed the material was thermally stable up until 480 °C and mesoporous in nature, respectively. Scanning electron microscope (SEM) and transmission electron microscope (TEM) showed that the material is spherical in shape and energy dispersive spectroscopy (EDS) further corroborated their formation. From the degradation analysis, 90% of the malachite green (MG) dye could be degraded in 60 min at optimum conditions (pH 6, 25 mg and 10 mg l^{-1}) and the holes were responsible for the degradation. Lastly, when tested against antibiotics, the ZnS material managed to degrade both the sulfisoxazole (SSX) and sulfamethoxazole (SMX). These results showed that the ZnS nanoparticles could be used as a multifunctional material for the degradation of various pollutants.

1. Introduction

Water scarcity has become a threat to the human kind for some decades. The reports from the World Health Organization estimated that about 1.1 billion of people are unable to access safe and clean water worldwide. This is as a result of industrialization, urbanization, climate change, human activities and agricultural activities [1]. The number of contaminants found in our water streams has increased over the years in particular the dyes and antibiotics [2]. This is due to the over reliance on organic dyes by the textile industry especially for dying cloths, thus causing leaching. Also with the high number of patients being prescribed antibiotics such as sulfisoxazole (SSX) and sulfamethoxazole (SMX) due to various ailments, these drugs tend to be excreted through urine and faeces, causing a high concentration in our water streams [3, 4]. These pollutants if they are not attended to and exceed the permissible levels, they can be detrimental to both human and aquatic life. Hence, the use of semiconductor photocatalyst has emerged as a promising way to remove these pollutants from wastewater. Several methods have been used for the removal of organic pollutants such as dyes, but because these dyes consist of the complex structure, most methods such as reverse osmosis, adsorption, electrocoagulation etc have fallen short [5]. These methods either rely on expensive adsorbents, produce secondary pollutants, need multiple steps or require high energy, which may not be feasible when one considers cost factors. Antibiotics are