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

Judul Karya Ilmiah (Prosiding)	:	Growth and UV absorption of 5 mol% Zn-doped CeO_2 nanoparticle synthesized with a simple precipitation process		
Nama/ Jumlah Penulis	:	4 Orang		
Status Pengusul	:	Penulis pertama/ ~~Penulis ke 5~~ / Penulis Korespondesi **		
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		c. Thn Terbit, Tempat Pelaks.	:	12-14 November, Lombok
		d. Penerbit/Organiser	:	Trans Tech Publications
		e. Alamat Repository/Web	:	https://www.scientific.net/MSF.827.62
		Alamat Artikel	:	http://doc-pak.undip.ac.id/21363/5/11.pdf
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Semarang, 15 Mei 2023

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Semarang, 3 Mei 2023
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g. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	9		8,77
h. Kelengkapan unsur dan kualitas terbitan /prosiding (30%)	9		8,70
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   Penelitian ini berfokus pada sintesis nanopartikel 5 mol% Zn-doped CeO_2 menggunakan proses presipitasi sederhana. Struktur dan pertumbuhan 5 mol% Zn-doped CeO_2 dianalisis menggunakan difraksi sinar-X, kristalinitas meningkat seiring dengan peningkatan suhu kalsinasi. Pengukuran spektrofotometer UV-Vis mengungkapkan bahwa sifat penyerapan UV dari 5 mol% Zn-doped CeO_2 ditingkatkan dengan peningkatan suhu kalsinasi. Nanopartikel 5 mol% Zn-doped CeO_2 yang dikalsinasi pada suhu 600°C ditemukan lebih efektif sebagai penghalang UV. Pembahasan tersebut disajikan secara mendalam pada artikel ini.
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Growth and UV absorption of 5 mol% Zn-doped CeO_2 nanoparticle synthesized with a simple precipitation process

Nurhasanah, Iis ; Efendi, Aula Fitra; Sutanto, Heri; Priyono
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Abstract

Nanoparticles of the 5 mol% Zn-doped CeO_2 have been synthesized with a simple precipitation process from aqueous/alcoholic solution of cerium nitrate and zinc nitrate mixture at room temperature. Dried precipitates were calcined at 300-700oC for 2 hours. The structure and growth of 5 mol% Zn-doped

CeO_2 was investigated using X-ray diffraction measurement. All peaks in the X-ray diffraction patterns were identified and indexed as single crystalline phase of cubic fluorite CeO_2. The rise in calcination temperature increases the crystallite size from 5.51 to 15.56 nm and improves their crystallinity. The low activation energy for crystallite growth of the 5 mol% Zn-doped CeO_2 is found to be 10.85 kJ/mol. The UV-Vis spectrophotometer measurement showed that the UV absorption property of the 5 mol% Zn-doped CeO_2 is enhanced with increasing calcination temperature. The 5 mol% Zn-doped CeO2 nanoparticle calcined at a temperature of 600oC is found to be more effective as UV-blocker. © (2015) Trans Tech Publications, Switzerland.

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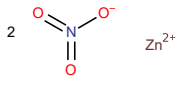

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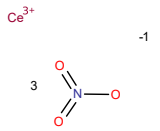

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Chapter 5: Materials for Sensors

Chapter 6: Researching and Designing of Fabrication Technologies

Chapter 7: Applied Research Techniques of Phenomena in Solid State Materials

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Optical, Structural and Morphological Properties of Ternary Thin Film Blend of P3HT:PCBM:ZnO Nanoparticles

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Keywords: ZnO nanoparticles, ternary blend film, optical absorption, crystal structure, morphology.

Abstract. Ternary blend film of conjugated polymer, fullerene and inorganic nanoparticles has intensively studied as active material for high power conversion efficiency (PCE) of hybrid solar cells. The mixing of two electron acceptor materials consisting of organic fullerene and inorganic nanoparticles with electron donor conjugated polymer is strongly believed can improve the PCE of solar cells. This ternary blend will increase exciton dissociation efficiency due to the increase of interface area between donor and acceptor materials where exciton dissociation takes place. We have studied optical, structural and morphological properties of ternary thin films containing blend of conjugated polymer poly(3-hexylthiophene (P3HT):fullerene derivative PCBM:Zinc oxide nanoparticles (ZnO-NPs) by measuring their optical absorption, crystal structure and thin film surface morphology. The aim of this research is to ensure that the P3HT, PCBM and ZnO-NP are well mixed both in solutions and in thin films. The ZnO-NP was prepared by using sol-gel method. The average particle size of ZnO-NP is 40 nm as derived from UV-Vis spectrum and confirmed with TEM image. Thin blend films were prepared by using spin-coating method. The UV-Vis spectra show that conjugated polymer P3HT, PCBM and ZnO-NP are well mixed both in solutions and in thin films. Moreover, the well mixed of these three materials are also verified by the XRD pattern and SEM image of the ternary blend film.

Introduction

Hybrid organic and inorganic solar cells have been extensively studied for achieving high power conversion efficiency (PCE) solar cells. Conjugated polymer poly(3-hexylthiophene) or P3HT is commonly used as organic material in hybrid solar cells due to its well known semiconducting properties and easily to dissolve in common organic solvent, therefore, it offers low-cost thin film processing such as spin-coating, inkjet-printing and roll-to-roll printing. On the other hand, zinc oxide (ZnO) is widely used as inorganic material in hybrid solar cells because it can be synthesized into nanoparticles by using low-temperature chemical methods such as sol-gel method. Moreover, ZnO is non-toxic, its electron mobility is higher than that of other metal oxide like titanium dioxide (TiO_2) and it can be formed in a large variety of nanostructures [1]. However, ZnO nanoparticle (ZnO-NP) is easily agglomerate to form larger size which reduces exciton dissociation at conjugated

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Optical property enhancement of silica-modified polyaniline grown on glass substrate via incorporation of zinc sulfide into the polymer matrix

Melchor J. Potestas, Arnold C. Alguno, Reynaldo M. Vequizo, Bianca Rae B. Sambo, and Majvell Kay G. Odarve

Materials Science Laboratory, Department of Physics, MSU-Iligan Institute of Technology,

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Keywords: Chemical bath deposition, nanocomposite, optical property, PAni emeraldine, silica-modified polyaniline, zinc sulfide.

Abstract. Growth of zinc sulfide (ZnS) nanostructures on silica modified-polyaniline (SM-PAni) with polymerization time-dependent was prepared using chemical bath deposition (CBD) technique. The grown samples were characterized by scanning electron microscopy (SEM), fourier transform infrared (FTIR) spectroscopy, and ultraviolet-visible (UV-Vis) spectroscopy. SEM images revealed some voids in the nanocomposites. The average diameter of the grown ZnS nanospheres did not significantly change by changing the growth time of the polyaniline. FTIR spectra and UV-Vis absorption spectra revealed the partial transformation of emeraldine salt polyaniline into emeraldine base PAni due to the deprotonation triggered during CBD for the synthesis of ZnS nanostructures. Furthermore, UV-Vis absorption spectra reveal synergistic effect of the absorption bands of both polyaniline and ZnS nanostructures. This synergistic effect results to the enhancement in the optical property of the fabricated nanocomposite which is an essential property in optoelectronics and solar cell application.

Introduction

Over the past two decades, significant scientific development and technological interest has been devoted in the study of organic and inorganic nanocomposites. The growth of inorganic nanoparticles into the polymer matrix can provide thermally stable, high performance, and novel materials for optoelectronics and sensor applications [1-2]. As a result of the advancement of nanotechnology, inorganic-organic nanocomposite materials have been designed and fabricated with unique chemical, physical, and optical properties for specific application.

Polyaniline (PAni) is one of the most studied forms among conducting polymers due to its unique properties and easy fabrication method [1-2]. The emeraldine salt oxidation state of PAni is the most investigated form due its conductivity, environmental stability, and tunable morphology for its absorption capability [3-4]. The synthesis of this polymer can produce a variety of "one-dimensional" morphologies, like rectangular structures [5], nanotubes [6], nanofibers[1, 7], micromats [7],or even nanodisks [7], which made them unique materials for specific device application. A standard way to tune and improve the morphology of PAni nanostructures is by the introduction of a suitable steric stabilizer [8]. Smoother and more uniform surface will be achieved due to the non-formation of PAni agglomerates upon the introduction of steric stabilizer [9]. It is known that PAni has high absorption spectra along the UV region and a part of the visible region of the electromagnetic spectrum [10]. Improving the morphology of PAni may affect the optical property of the polymer which is an essential factor in optoelectronics applications.

Another promising material that has been widely studied in the field of optoelectronics application is Zinc Sulfide (ZnS) [11-13]. ZnS belongs to II-VI group compound semiconductors and has a wide energy band gap [14, 15]. Several studies present different techniques in its fabrication which leads to its different morphologies [15-16]. One noble way in preparing ZnS nanostructures is by chemical bath deposition (CBD). In this method, nanostructures are deposited on substrate immersed in a solution containing metal ions source, hydroxides, and sulfide ions [17]. The