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

Judul Karya Ilmiah (Artikel) : Rootlike Morphology of ZnO:Al Thin Film Deposited on Amorphous Glass Substrate by Sol-Gel Method

Jumlah Penulis : 5 orang

Status Pengusul : ~~Penulis pertama/~~ Penulis ke-5/ ~~Penulis Korespondensi~~ **

Identitas Jurnal Ilmiah :

- a. Nama Jurnal : Physics Research International
- b. Nomor ISSN : 2090-2239
- c. Volume, Nomor, Bulan, Tahun : Vol. 2016 , No. -, Mei 2016
- d. Penerbit : Hindawi
- e. DOI artikel (jika ada) : <https://doi.org/10.1155/2016/4749587>
- f. Alamat web jurnal : <https://www.hindawi.com/journals/physics/2016/4749587/>
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Semarang, 26 Mei 2022

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Semarang, 26 Mei 2022

Reviewer 1

[Signature]

Prof. Dr. Drs. Wahyu Setia Budi, M. S.

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Unit Kerja : Fisika

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d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12			11
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Paper ini membahas tentang deposisi lapisan tipis seng oksida (ZnO) dan seng oksida (ZnO:Al) yang didoping aluminium pada substrat kaca dengan metode pelapisan semprot sol-gel pada tekanan atmosfer. Hasilnya dikarakterisasi dengan difraktometer sinar-X (XRD), dipindai dengan mikroskop elektron (SEM), dan spektrofotometer UV-Vis. Peningkatan konsentrasi doping Al dalam film ZnO berkontribusi pada peningkatan celah pita optiknya.

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Semarang, 8 Juni 2022

Reviewer 2



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Rootlike Morphology of ZnO:Al Thin Film Deposited on Amorphous Glass Substrate by Sol-Gel Method

[Sutanto, Heri^a](#) ; [Durri, Sufwan^a](#) ; [Wibowo, Singgih^a](#) ; [Hadiyanto, Hady^b](#) ;

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Abstract

Zinc oxide (ZnO) and aluminum doped zinc oxide (ZnO:Al) thin films have been deposited onto a glass substrate by sol-gel spray coating method at atmospheric pressure. X-ray diffractometer (XRD), scanning electron microscopy (SEM), and UV-Vis spectrophotometer have been used to characterize the films. XRD spectra indicated that all prepared thin films presented the wurtzite hexagonal structure. SEM images exhibited rootlike morphology on the surface of thin films and the shortest root diameter was about 0.219 μm . The UV-Vis absorption spectra exhibited the absorption edges that were slightly shifted to the lower wavelength. From this result, the incorporation of aluminum into the ZnO involved a slight increase in the optical band-gap of films. The optical bands of films were 3.102 eV, 3.115 eV, 3.118 eV, 3.115 eV, 3.109 eV, and 3.109 eV for ZnO, ZnO:Al 2%, ZnO:Al 4%, ZnO:Al 6%, ZnO:Al 8%, and ZnO:Al 10%, respectively. Increase of Al doping concentration in ZnO films contributed to the

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Characterization of Pure and Al Doped ZnO Thin Films Prepared by Sol Gel Method for Solar Cell Applications

Bouacheria, M.A. , Djelloul, A. , Adnane, M. (2022) *Journal of Inorganic and Organometallic Polymers and Materials*

Analysis of Fe-doped ZnO thin films for degradation of rhodamine b, methylene blue, and Escherichia coli under visible light

Sutanto, H. , Alkian, I. , Mukholit, M. (2021) *Materials Research Express*

Modification of surface morphology and lattice order in nanocrystalline ZnO thin films prepared by spin-coating sol-gel method

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Synthesis of Magnesium Oxide Nanopowder by Thermal Plasma Using Magnesium Nitrate Hexahydrate

Article of the Year Award: Outstanding research contributions of 2020, as selected by our Chief Editors. [Read the winning articles.](#)

Research Article

Polymorphs of Tolfenamic Acids: Stability Analysis Using Cluster Method

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We report results of the relative stability between form I and form II of tolfenamic acid. By performing systematic cluster calculations at the B3LYP/6-31G* level of theory and including the corrections to the dispersion and basis set superposition error, we found that form II is energetically more stable than form I. Furthermore, we found that the formation of dimers has a stabilizing effect compared to individual monomers in the clusters that we have considered.

1. Introduction

Polymorphs are compounds with the same chemical formula but with different arrangements of the molecules in the solid state. Due to the difference in the physical characteristics between the polymorphs, an understanding of the polymorphs is of the utmost importance for the proper usage of a compound. The studies of polymorphs involve diverse fields, employing experimental and theoretical approaches. However, even though studies are aplenty in this field, there are still questions to be answered, as pointed out in a few recent review articles on polymorphism [1, 2]. To elucidate the stability between different polymorphs, the concept of relative energy is usually used. Apart from the molecular energy or the lattice energy, the energy of molecular conformers and the crystal lattice energies have also been put forward [3, 4]. Since there are interactions between molecules in the crystal, by including the lattice energy, this approach takes into consideration the interaction energy between the molecules and avoids assessing the stability of the polymorphs based on just the stability of the molecular conformer.

In this report, the focus is on a compound known as tolfenamic acid, a nonsteroidal anti-inflammatory drug. Tolfenamic acid was initially found in two forms, the white (form I) and the yellow (form II) [5]. A decade later, this compound

was reported to exist in five polymorphic forms [6]. The two most studied forms are shown in Figure 1. The comparison of the stability of tolfenamic acid was first given by Andersen et al., where it was reported that the yellow form is more stable than the white form based on their analysis of the crystal structures and their physical properties [5]. This is in agreement with the results from the theoretical consideration of the total energy, studied using the periodic calculations [7]. The same conclusion was obtained by Mattei and Li from the calculations of molecules in the gas phase [8, 9]. In addition, these results are in agreement when the density of the forms is considered, where the yellow form is denser than the white form [7]. However, disagreement arises when comparison between the polymorphs is made using the lattice energy. Using solution calorimetry, Surov et al. found that the yellow form is more stable than the white form by $6.7 \pm 1.2 \text{ kJ mol}^{-1}$ [7]. This result contradicted with the ones reported by Mattei and Li [9] and Uzoh et al. [10], where the white form is more stable than the yellow form by $\sim 3 \text{ kJ mol}^{-1}$ and 2 kJ mol^{-1} , respectively.

In this study, we embarked on the objective to clarify the contradicting trend of the stability of form I and form II of tolfenamic acid. We will provide energetic perspective from the cluster method. The cluster method is different from other methods as it incorporates the molecules in an explicit

Research Article

Synthesis of Magnesium Oxide Nanopowder by Thermal Plasma Using Magnesium Nitrate Hexahydrate

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Magnesium oxide (MgO) nanopowder was synthesized by thermal plasma in a novel thermal DC plasma torch using magnesium nitrate hexahydrate. Magnesium nitrate hexahydrate ($\text{Mg}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$) was obtained from serpentinite ($\text{Mg}_3\text{Si}_2\text{O}_5(\text{OH})_4$; lizardite) (Halilovskiy array, Orenburg region, Russia). The synthesized samples were characterized by analytical techniques including X-ray diffraction (XRD) and transmission electron microscopy (TEM). XRD and TEM characterization studies confirmed that MgO nanopowder obtained has periclase structure with high purity, and the particle sizes vary within the range of 100 nm to 150 nm. We believe that the present work will promote further experimental studies on the physical properties and the applications of MgO nanopowders in the fields such as high-densified ceramics, additives in bactericide, and refractory products.

1. Introduction

Magnesium oxide (MgO) is an attractive material which has many potential applications, such as water purification, optoelectronics, and microelectronics, is an additive in heavy fuel oil, paint, gas separation, and bactericides, and is an insulator in industrial cables, crucibles, and refractory materials. However, the useful properties of MgO are further enhanced when used as nanosized powder with novel nanostructures [1–4]. Many methods like flame spray pyrolysis [5], combustion aerosol synthesis [6], hydrothermal method [7], laser vaporization [8], chemical gas phase deposition [9], solvothermal method [10], aqueous wet chemical method [11], and others [12–14] have been developed for the synthesis of nanosize of MgO.

Among the different techniques commonly used for preparation of magnesium oxide, thermal plasmas which provide high temperatures and steep temperature gradients offer an attractive and chemically unspecific route for synthesizing fine refractory powders [15–18]. Thermal plasmas

suitable for synthesis are primarily produced by means of high intensity AC or DC arcs, high frequency discharges, DC-RF hybrid plasmas, and a reactive submerged arc (RSA). Depending on the process, either the discharge itself or the plasma flame downstream of the discharge may be used for synthesizing the powders. In thermal plasma synthesis, the reactants may be gases, liquids, or solids before injection into the plasma [19].

In this paper, we report the synthesis and characterization of magnesium oxide nanopowder by thermal plasma in a novel thermal DC plasma torch using magnesium nitrate hexahydrate as the precursor.

2. Experimental Procedure

Magnesium nitrate hexahydrate ($\text{Mg}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$) was obtained from serpentinite (Halilovskiy array, Orenburg region, Russia). Serpentinite consisted mostly of magnesium, silicon, and iron in the form of serpentinite ($\text{Mg}_3\text{Si}_2\text{O}_5(\text{OH})_4$; lizardite).