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

Judul Karya Ilmiah (Artikel) : Modeling of x-ray attenuation on SS316 metal foam shielding using MCNPX
 Jumlah Penulis : 3 orang
 Status Pengusul : Penulis pertama/ Penulis ke- / Penulis Korespondensi **
 Identitas Jurnal Ilmiah : a. Nama prosiding : Journal of Physics: Conference Series
 b. Nomor ISSN : 1742-6588, 1742-6596
 c. Tahun terbit, tempat pelaksana : 2021, Surakarta Indonesia
 d. Penerbit : IOP Publishing
 e. Alamat web jurnal : <https://iopscience.iop.org/article/10.1088/1742-6596/1825/1/012094>
 f. Terindeks di Scimagojr/Scopus atau di... **
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b. Ruang lingkup dan kedalaman pembahasan (30%)	8,6	8,5	8,55
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	8,5	8,8	8,65
d. Kelengkapan unsur dan kualitas penerbit (30%)	8,5	8	8,65
Total = (100%)			28,75
Nilai untuk Pengusul : $60\% \times 28,75 = 17,25$			

Semarang, 27 Mei 2021

Reviewer 1



Prof. Dr. Drs. Muhammad Nur, DEA
 NIP. 195711261990011001
 Bidang ilmu/Unit kerja : Fisika/Fakultas Sains dan Matematika

Reviewer 2



Prof. Dr. Kusworo Adi, S.Si., M.T.
 NIP. 197203171998021001
 Bidang ilmu/Unit kerja : Fisika/Fakultas Sains dan Matematika

LEMBAR
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Hasil Penilaian Peer Review :

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b. Ruang lingkup dan kedalaman pembahasan (30%)	9		8,6
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	9		8,5
d. Kelengkapan unsur dan kualitas terbitan /prosiding (30%)	9		8,5
Total = (100%)	30		28,4
Nilai Pengusul = 60% x 28,4 = 17,04			

Catatan Penilaian Paper oleh Reviewer :

1. Kelengkapan unsur isi jurnal:

Artikel telah ditulis sesuai dengan format Journal of Physics: Conference Series. Latar belakang sangat jelas dan kebaruan dikemukakan secara eksplisit. Unsur-unsur artikel lengkap.

2. Ruang lingkup dan kedalaman pembahasan:

Ruang lingkup tidak begitu luas. Pembahasan belum baik dan cenderung banyak hasil tidak dibahas. Dalam artikel ini tak terdapat diskusi/pembahasan sebagai pembandingan dengan hasil penelitian dalam referensi yang digunakan.

3. Kecukupan dan kemutakhiran data/informasi dan metodologi:

Data dan referensi mutakhir. Metoda standard dan dapat direfleksikan oleh peneliti lain.

4. Kelengkapan unsur dan kualitas terbitan:

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Semarang, 10 Juni 2022

Reviewer 1



Prof. Dr. Drs. Muhammad Nur, DEA

NIP. 195711261990011001

Unit Kerja : Fisika

Bidang Ilmu: Fakultas Sains dan Matematika

LEMBAR
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Hasil Penilaian Peer Review :

Komponen Yang Dinilai	Nilai Maksimal Prosiding		Nilai Akhir Yang Diperoleh
	Internasional ☒	Nasional ☐	
a. Kelengkapan unsur isi prosiding (10%)	3		3
b. Ruang lingkup dan kedalaman pembahasan (30%)	9		8,5
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	9		8,8
d. Kelengkapan unsur dan kualitas terbitan /prosiding (30%)	9		8
Total = (100%)	30		28
Nilai Pengusul = 60% x 28 = 16,8			

Catatan Penilaian artikel oleh Reviewer :

1. Kesesuaian dan kelengkapan unsur isi jurnal:

Isi jurnal telah sesuai dan lengkap dari komponen-komponen yang ada abstrak, pendahuluan, prosedur eksperimen, hasil dan pembahasan, lalu kesimpulan dan daftar pustaka yang digunakan.

2. Ruang lingkup dan kedalaman pembahasan:

Paper ini membahas tentang simulasi/pemodelan menggunakan MCNPX untuk mengembangkan alternatif bahan yang digunakan sebagai perisai radiasi. Dalam simulasi ini, teknologi metal foam diharapkan dapat mendekati kemampuan pelat timbal sebagai radiasi perisai yang lebih ringan dan ramah lingkungan. Dari bahan yang disimulasikan, berupa busa logam dari stainless steel SS316 dengan ketebalan 5-40 mm, diameter 2, 3, dan 4 mm pada energi 0,1, 0,662, dan 1 MeV menunjukkan kemampuannya meyerap radiasi mendekati timbal.

3. Kecukupan dan kemutakhiran data/informasi dan metodologi:

Data-data serta metodologi yang digunakan dalam penelitian ini sudah baik dengan jumlah referensi kurang dari 5 tahun sejumlah 5.

4. Kelengkapan unsur dan kualitas terbitan:

Karya ini diterbitkan dalam prosiding internasional berkualitas Q3 oleh IOP Publishing dengan unsur-unsur yang lengkap serta kualitas yang baik.

Semarang, 9 Juni 2022

Reviewer 2



Prof. Dr. Kusworo Adi, S.Si., M.T.

NIP. 197203171998021001

Unit Kerja : Fisika

Bidang Ilmu: Fakultas Sains dan Matematika

Certificate of Attendance

to

Eko Hidayanto

as

Speaker

In "The 10th International Conference on Physics and Its Applications"

Surakarta, Indonesia on August 26th, 2020

organized by Physics Departement, Faculty of Mathematics and
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Modeling of x-ray attenuation on SS316 metal foam shielding using MCNPX

[Hidayanto E.](#) ; [Budi W.S.](#) ; [Arianto F.](#)

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^a Department of Physics, Faculty of Science and Mathematics, Diponegoro University, Semarang, Indonesia

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Abstract

The use of lead plates as shielding to X-ray radiation has the disadvantages of being heavier and not environmentally friendly when compared to other materials. Currently, metal foam technology is developed that is expected to be close to the ability of lead plate as a radiation shielding that is lighter and environmentally friendly. This research was conducted by modeling SS316 stainless steel plates and foams for the thickness of 5–40 mm, the diameter of 2, 3, and 4 mm at an energy of 0.1, 0.662, and 1 MeV. The metal plate and foam modeling were carried out using the program of Monte Carlo N-Particle eXtended (MCNPX). Calculation of X-ray attenuation from the modeling results shows that SS316 stainless steel performance both in the form of plates and metal foams is almost equivalent to pure lead.

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Holschuh, T.V. , Parma, E.J. , Rochau, G.E.
(2012) *Transactions of the American Nuclear Society*

Preparation and Characterization of Hollow 316L Stainless Steel Spheres Prepared by Powder Metallurgy

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ICOPIA 2020

The 10th International Conference on Physics and Its Applications
Universitas Sebelas Maret, Surakarta, Central Java, Indonesia



Proceeding

10th International Conference on Physics and Its Applications (ICOPIA)
26 August 2020, Surakarta, Indonesia

Preface

International Conference on Physics and Its Applications (ICOPIA) is a biannual conference, started in 2001. This year of 2020, ICOPIA is the tenth one. This conference is mainly supported by Department of Physics, Universitas Sebelas Maret, Indonesia.

ICOPIA is a forum for presenting and discussing current research in physics and its applications. Varied studies about material physics, optics, geophysics, instrumentation, magnetism and theoretical physics have been presented in the 10th ICOPIA. All the papers were presented orally.

The keynote presentations by qualified speakers have been delivered in this conference. The keynote presentation included Rutile-Phased TiO₂ Nanostructured Towards Electronic Devices Application, Deep Learning for Biomedical Application, Control of nanoparticle-size in cobalt ferrite system and Improvement of Functional Oxide Properties for Applications. The keynote speakers were from Université du Littoral Côte d'Opale, France, University of Technology Sydney, Australia, Universiti Tun Hussein Onn Malaysia and Universitas Sebelas Maret, Indonesia.

This proceeding contains the papers presented in ICOPIA 2020. The papers are divided into sections: Acoustic, Computational Physics, Geophysics, Instrumentation, Material Physics, Optics, Theoretical Physics, and other topics related to Physics. This structure is made so that readers are easier to find an article in this proceeding.

We would like to thank to all the participants attending this conference and also to the committees for their contribution to this high-level conference and its overall success. We also would like to thank to the reviewers for their positive contribution to maintain the quality of the articles presented in this conference.

Nuryani, Ph.D
General Chair of ICOPIA2020

ICOPIA 2020

The 10th International Conference on Physics and Its Applications
Universitas Sebelas Maret, Surakarta, Central Java, Indonesia



10th International Conference on Physics and Its Applications (ICOPIA)

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Accepted papers received: 12 February 2021

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Calibration of Fourier Transform Spectrometer with Blackbody Temperatures Optimally Determined

Achmadi A^{1,3}, Lee J S^{1,2}, Lim J S^{1,2}, and Park S N^{1,2}

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²Korean Research Institute for Standard and Science, Daejeon, South Korea

³Center for Research and Human Resources Development, National Standardization Agency of Indonesia, Tangerang Selatan, Indonesia

Email: aditya@bsn.go.id, snpark@kriss.re.kr

Abstract. Spectral responsivity calibrating of Fourier Transform Spectrometer (FTS) is essential for eliminating its systematic error in a ground-based solar observation system. Conventionally the calibration is being done by the three-temperature blackbody method, which gives a spectral responsivity curve of the FTS under calibration in addition to the respective temperatures of the blackbody. It is an advantage that the method does not require pre-information on the blackbody temperatures. However, a combination of three temperatures remains a question in terms of the calibration accuracy. In this paper, the method is applied to a high level of radiance calibration at a wavenumber range from 2000 cm⁻¹ to 8000 cm⁻¹. We propose a technique which determines an optimal combination of the three temperatures in the blackbodies to improve the calibration accuracy of the FTS. Experiments were carried out using four arbitrary combinations of blackbody temperatures settings and an optimal combination of the temperature settings. The result deviation of the optimal combination is less than 0.5% and 3% for measured temperature and spectral radiance respectively, which is better than the arbitrary temperature combinations.

1. Introduction

A Fourier transform spectrometer (FTS) is a spectrum analytical instrument that is based on the interferometric method; an FTS can be used to provide accurate measurements in radiometric units at high spectral resolution, including radiance or irradiance measurements, emissivity or reflectivity measurements, and ground-based measurements of transmitted solar radiance to determine the amount of a particular atmospheric gas [1]. Therefore, these spectrometers are widely used in many measurement applications [2]. Calibration of Fourier transform spectrometer (FTS) is important to eliminate the systematic error due to the different characteristics of each instrument and make the measured spectra can be standardized [3], moreover in atmospheric measurement it's also can improve the accuracy of retrievals codes calculation [4].

Generally there are two group method are being use for FTS calibration; the two blackbody-temperatures and the three blackbody-temperatures method [5][6][7][8]. All methods needs a blackbody light source at certain temperature as the reference to calculate the responsivity curve of the FTS as the calibration result. The two temperature method is more simple compare to another method



Photoluminescence study of undoped GaAs at temperatures 300 K and 77 K

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²Department of physics, Prince of Songkla University, 15 Karnjanavanich Rd., Hat Yai, Songkla 90110, Thailand

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Abstract. This work presents an experimental study of photoluminescence spectra from GaAs thin layer at temperature 300 K and 77 K. PL spectra were used to investigate the characteristics of the material, such as the photon energy, gap energy, and the type of radiation transition. The apparatus used in the experiment are green laser with a wavelength of 532.0 nm, laser power supply, 500 mm focus lens, ocean optics USB 2000 spectrometer, fiber optic cable, USB cable, and the computer software installed ocean view and origin pro. The characterization was carried out at temperatures of 300 K and 77 K with power variation in the range 40 mW - 150 mW. The emitted spectrum was analyzed by observing the wavelength and calculating the photon energy and the gap energy. The results showed that laser power variation does not affect the emitted wavelength. However, it is affected by temperature. The emitted wavelength is 840 nm at 300 K and 790 nm at 77 K. The value of gap energy at 300 K is 1.422 eV while at temperature 77 K is 1.519 eV. The photon energy at temperatures 300 K and 77 K were 1.465 eV and 1.560 eV, respectively. The type of transition is a band-to-band transition at 300 K and Free Exciton (FE) at 77K. These results are consistent with existing theories, so the characterization of undoped GaAs has done successfully.

1. Introduction

Direct semiconductor such as GaAs has different electrical and optical properties compared to silicon[1]. GaAs is relatively insensitive to overheating because it has wider bandgap energy and tends to make less noise on electronic circuits, especially at high frequencies. The preparation of GaAs sample in this experiment was grown by *Molecular Beam Epitaxy* (MBE). The growth of layers from the molecular beam epitaxy is almost independent of the melting point, so it is possible to grow GaAs to form hetero-related relationships. The hetero-structure formed in GaAs material with other materials can be used for quantum device[2-4]. GaAs-based quantum well structures have the potential for laser applications that can emit infrared wavelengths[5, 6].

The properties of insulators or conductors of GaAs semiconductor materials can be observed through their characteristics[7]. Photoluminescence (PL) as non-destructive methods is a useful technique for observing the electrical properties of GaAs. The technique is used without contact and does not damage the material[8]. The FWHM (*Full Width at Half Maximum*) of PL spectrum can be used to analyze the types of radiation transition and bandgap, that might be useful for investigating carrier recombination that is a radiative recombination[9, 10].



Microstructure and corrosion behaviour of ultrafine-grained pure magnesium by severe plastic deformation as a biodegradable material

M Rifai^{1,*}, A D Prasetya¹, Mujamilah¹ and H Miyamoto²

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²Department Science and Engineering, Doshisha University, Kyotanabe Campus, Kyoto, Japan

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Abstract. Microstructure and corrosion behaviour of ultrafine-grained pure magnesium by severe plastic deformation has been investigated in term on initial deformation process as a biodegradable material. Equal channel angular pressing (ECAP) has been chosen as severe plastic deformation which can be introduced into the material without changing the material geometry. The ECAP process was carried out at 523 K. The microstructure was characterized by scanning electron microscope which is equipped by electron backscatter diffraction, and the corrosion behaviour was investigated by electrochemical test. The ECAP processed sample show that the deformation structures has sub boundaries in one pass and a high fraction of high angle grain boundary due to high misorientation in the grain boundaries. The corrosion behaviour exhibited that ECAP processed sample has a lower corrosion rate than that as-annealed sample due to deformed structure.

1. Introduction

Grain refinement can be achieved at metallic material by enhancing the energy into the material by severe plastic deformation (SPD) [1-5]. These phenomena can be done by dislocation appearance inside the grain. The dislocation moves between grain due to high energy motion. Regarding the grain boundaries is quite different from the grain itself due to diffusion characteristic. It makes high grain boundary fraction influence the passivation in the surface of metallic material. Previous research shows that grain boundary can be used to improve the corrosion resistance by enhancing the passivation layer [6-8]. The grain-refined surfaces typically will be inclined to undergo greater rapid corrosion resistance. By increasing the strength of the material by grain refinement, it also can affect corrosion behaviour such as decreasing corrosion rates. This concept can be implemented on magnesium as a biodegradable metallic material, due to high energy to weight ratio [9-11].

Magnesium has been chosen as a biodegradable material due to low density and excellent strength [1-7]. On the other hand, magnesium is limited due to low formability and low corrosion resistance. Grain refinement by SPD can solve this limitation by improving mechanical and electrochemical properties. SPD is a technique which uses a large strain on the material for introducing high energy into dislocation motion inside grain and promote grain refinement. This refinement process improves the mechanical properties, especially material strength by the deformation process. One popular technique in SPD is equal channel angular pressing (ECAP) which can introduce high energy into a material and



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A facile route of two-dimensional metal oxide nanosheets fabrication by atomic layer deposition

E Riyanto^{1,*}, E Martides¹, E Junianto¹, A Rajani¹, Kusnadi¹, B Prawara², H Gaoshan³ and M Yongfeng³

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Abstract. In this study, two-dimensional nanosheets are fabricated by atomic layer deposition with sacrificial polymers. This method enables to fabricate free thin nanosheets with thickness of nanoscale. In the preparation, TiO₂ and ZrO₂ metal oxides are deposited onto substrates of Polyacrylic acid and Polyvinyl alcohol acted as sacrificial substrates. By dissolving the substrate, free-thin sheets layer with a high aspect ratio can be achieved due to the exfoliation mechanism. It was shown that the 2D nanosheets can be successfully formed on the deposited ALD material layer which can withstand the emergence of interfacial stress in the region of ALD layer – sacrificial substrate. The achieved nanosheets are characterized by using AFM, which shows that the thickness of both TiO₂ and ZrO₂ nanosheets are ~ 80 nm which formed with 1000 and 600 ALD cycles, respectively. The 2D nanosheets obtained in this study have potential applications for photocatalysis, water splitting, and lithium ion battery.

1. Introduction

The discovery of graphene has triggered great interest in two-dimensional (2D) nanomaterials for scientists in chemistry, physics, materials science, and related areas [1,2]. Two-dimensional nanomaterials such as nanosheets, nanoflakes, and nanoplates have been receiving great attention owing to their unique properties and potential applications in electronics, sensing, and catalysis [3-5]. 2D nanosheets, which possess atomic or molecular thickness and infinite planar dimensions are regarded as the thinnest functional nanomaterials [6,7]. In this concept, 2D nanosheets are defined as materials that do not require a substrate to exist which can be isolated as freestanding, molecularly thin sheets [6,8]. Atomic layer deposition (ALD) is able to deposit an atomic film with features of a high precision thickness control, conformal deposition, excellent uniformity, and self-limiting surface reaction [9-11]. The advantages of ALD are precise thickness control at Ångstrom or monolayer level (i.e. typical Al₂O₃ growth rates are ~1.1 Å per cycles) [12,13]. In this study, the 2D metal oxide nanosheets of TiO₂ and ZrO₂ were fabricated by ALD with sacrificial polymer of polyacrylic acid and polyvinyl alcohol. The nanosheets formation process was carried out by removing the sacrificial substrate which the ALD layer separate from the dissolved substrate with and without mechanically scratch in water as a solvent.

