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Judul Jurnal Ilmiah (Artikel) : Synthesis of Tin Oxide Nanoparticles by Pulsed Laser Ablation Method Using Low-Energy Nd: YAG Laser as an Antibacterial Agent

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Status Pengusul : ~~Penulis pertama~~/ Penulis ke 3 / Penulis Korespondensi **

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Semarang, 5 Maret 2022

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NIP. 197203171998021001
Bidang ilmu/Unit kerja : Fakultas Sains dan Matematika/Fisika

Reviewer 2



Dr. Eng. Eko Hidayanto, S.Si., M.Si.
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Makalah sesuai dengan ruang lingkup jurnal yaitu nanoscience dan nanotechnologies, sehingga sesuai dengan topik yang ditulis. Pembahasan pada makalah ini sudah membandingkan dengan penelitian lain (10 refrensi dari 17 referensi) dan pembahasan sudah cukup baik (skor=12,00)

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Unit Kerja : Fisika
Bidang Ilmu: Fisika

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Paper ini membahas tentang Sintesis SnNPs menggunakan laser neodymium yttrium aluminium garnet (Nd:YAG) dengan panjang gelombang 1064 nm, durasi pulsa 7 ns, dan frekuensi laser 10 Hz..

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Semarang, 05 Maret 2022

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Reviewer 2

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Hollow Graphitic Carbon Nanospheres Synthesized by Rapid Pyrolytic Carbonization

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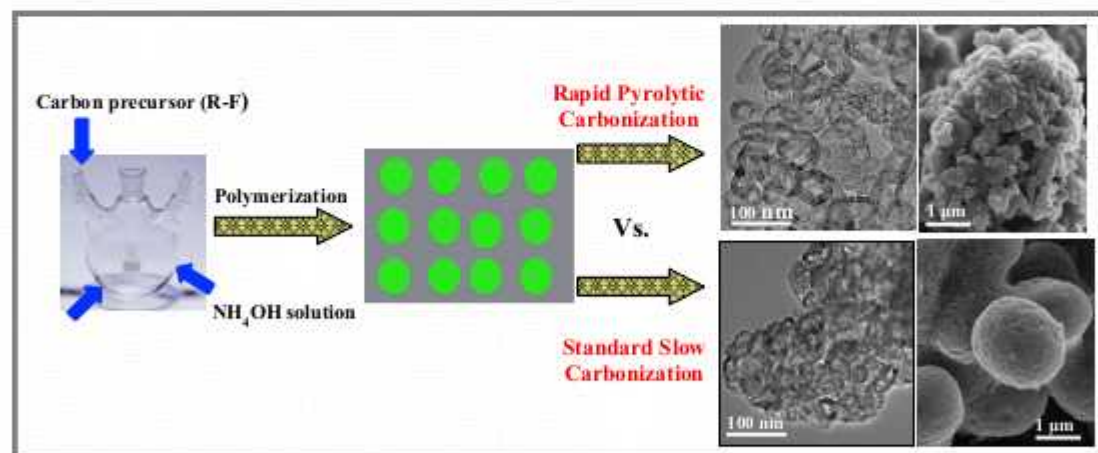
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Keywords: carbon nanosphere (CNS), rapid pyrolytic carbonization, agglomeration

Abstract. Hollow graphitic porous carbon nanosphere (CNS) materials are synthesized from polymerization of resorcinol (R) and formaldehyde (F) in the presence of templating iron polymeric complex (IPC), followed by carbonization treatment. The effect of rapid heating in the carbonization process is investigated for the formation of hollow graphitic carbon nanospheres. The resulting CNS from rapid heating was characterized for its structure and properties by transmission electron microscope (TEM), x-ray diffraction (XRD), Raman spectroscopy, bulk conductivity measurement and Brunauer-Emmett-Teller (BET) surface area. Hollow graphitic CNS with reduced degree of agglomeration is observed under rapid heating during the carbonization process when compared to the CNS synthesized using the standard slow heating approach.

Graphical Abstract



1. Introduction

Carbon is one of the most abundant elements on earth with many natural structures such as soot, diamond and graphite [1]. Carbon-based materials have been used for a wide variety of applications [2-3]. In general, graphitic carbon is preferred over amorphous carbon due to the desirable properties associated with graphitic carbon, such as well-defined crystalline structure, high electric conductivity, decent thermal stability, and reasonable oxidation resistance at low temperature [4]. Over the past three decades, several breakthroughs have been witnessed in carbon research for the discoveries of fullerenes [5], graphene [6] and nanotubes [3]. There have been enormous interests

Synthesis, Characterization, and Evaluation of Antimicrobial and Antioxidant Potential of *Polyalthia longifolia* Mediated Copper Nanoparticles

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Keywords: synthesis; plant extracts; nanoparticles; characterization; X-rays; free radical; inhibition zone

Abstract. Synthesis of nanoparticles of transition metals by using medicinal plants has been outstretched in recent years because of the characteristic features which are embodied in the end product. This work is proceeded with the aim to synthesize and optimize copper nanoparticles (CuNPs-PI) using aqueous extract of *Polyalthia longifolia* leaves (PIL) for characterization and evaluation of antimicrobial and antioxidant potential. The synthesis of CuNPs-PI was confirmed by visual inspection of the dark brown residues in the reaction flask and via absorption band around 580nm by UV/Visible spectroscopy. Synthesis process was optimized through investigation of environmental variables. FTIR analysis was carried out for both PIL and CuNPs-PI which identified the presence of alkanes, alcoholic, and aldehydic groups in the PIL and their encapsulation on the copper surface. The synthesized CuNPs-PI were found to be spherical and rod shaped, and polydispersed when investigated through SEM study. Similarly, these nanoparticles had monoclinic structure and crystalline nature when analyzed by XRD. Moreover, these nanoparticles showed metallic form when EDX examination was done. Further, biological activities were performed. The synthesized nanoparticles showed considerable inhibition zones against *Escherichia coli* (12mm), *Bacillus subtilis* (11mm), *Aspergillus niger* (10mm), and *Schyzophyllum commune* (16mm) which depicted their powerful antibacterial and antifungal activity. Likewise, CuNPs-PI were effeciently able to quench free radicals as indicated from the 2, 2-diphenyl-1-picrylhydrazyl (DPPH), hydrogen peroxide (H₂O₂), and nitric oxide (NO) assays by exhibiting 86.32, 50.45, and 48.23% inhibition respectively. Thus, the contemporary work has substantiated that low cost CuNPs-PI can be highly proficient alternate or substitute of synthetic formulations.

Introduction

The fabrication, design, and synthesis of novel nano materials using nanotechnology have become the main focus of research [1] due to their numerous applications in material science, physics, chemistry, medicine, and molecular biology [2]. In recent years, both chemical and physical methods have been applied for the synthesis of nanoparticles; but these methods require expensive and toxic solvents, high temperature and pressure, and more energy consumption [3,4]. In contrast to these, biological means for metals nanoparticles's synthesis is being gained more attention due to their several benefits like low cost, use of less toxic solvents, and most importantly ecofriendly nature [5]. Microorganisms, enzymes, or aqueous extracts have been employed for synthesis of nanoparticles, however, among these, microorganisms are not favorable due to drastic conditions associated with their handling [6]. On the other hand, the biological methods using medicinal plants in the form of aqua extracts [7] are appeared to be biocompatible and facile which complete in single step with less time consumption.