Author Guidelines

Instructions for authors
Editorial policy
Type of contributions
Research articles
Review articles
Research communications
Popular articles
Editorials
Review/ refereeing of articles
Proofs
Certifications, copyrights, reproductions & permissions
Transfer of copyright
Copying/ use of material from Journal articles
Ethical issues
Authorship
Research
Handling cases of misconduct
Plagiarism and Copyright violations
Important information
Visual Guidelines for the Author
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Synthesis of CdS nanoparticles by chemical route and their characterization

M.P. Deshpande*, Nilesh N. Pandya, Bindiya Soni, M.N. Parmar and G.K. Solanki
Department of Physics, Sardar Patel University, Vallabhi Vidyaganagar, 388 120

Abstract

With a direct bulk band gap semiconductor of 2.42 eV at room temperature, CdS nanostructured material have been prepared using various physical methods as well as by chemical methods with a view to their commercial or potential application in LED’s, solar cells or other optoelectronic devices. In the present study, the inverse micellar and chemical method are used to synthesize CdS nanoparticles. The stoichiometry of samples is confirmed by EDAX (Energy Dispersive Analysis of X-rays) and particle size of nanoparticles is estimated by TEM (Transmission Electron Microscopy) and XRD (X-ray Diffraction). The thermal analysis of CdS nanoparticles was carried out in temperature region of 40°C to 600°C in air and N₂ atmosphere to know about the stability of this material. The II – VI semiconductor nanoparticles are well known to exhibit a strong change of their optical absorption when their size is reduced down to a few nanometers which is visible from absorption spectrums taken on CdS nanoparticles dispersed in acetone in the UV-VIS region.

Keywords: II-VI group semiconductor, Nanomaterial, Inverse micellar, Optical absorption.

*Author for correspondence, e-mail: vitadeshpande@yahoo.co.in
• **Abstract**

This section highlights the main points of the article, outlines the results and conclusions, and elucidates the significance of the results.

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*Author for correspondence, e-mail: vidwadeshpande@yahoo.co.in*
Keywords

This section consists of the keywords present in the submission.

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Department of Physics, Sardar Patel University, Vallabh Vidyanagar, 388 120.

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Keywords: II-VI group semiconductor, Nanomaterial, Inverse micellar, Optical absorption.
• **Introduction**

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**Introduction**

Nanobiotechnology brings exciting new possibilities in the area of medical biology. Nanomedicines has been defined as the process of diagnosing, treating and preventing disease and traumatic injury, relieving pain, and preserving and improving human health (4), using molecular tools and molecular knowledge of the human body. One can envision nanocarriers that can be targeted to a specific tissue or cells to simultaneously detect and diagnose diseases as well as to treat them through the delivery of the therapeutics on the targeted organ and tissues (2). In general, miniaturization of our medical tools will provide more accurate, more reliable, more cost-effective and faster approaches to enhance the quality of human life. The aim of Nanomedicine may be broadly defined as the comprehensive monitoring, control, construction, repair, defense and improvement of all human biological systems, working from the molecular level using engineered devices and nanostructures, ultimately to achieve medical benefit and fitness.
Materials and methods

This consists of the main body of the submission.

Status of Nanomedicine

Several approaches towards nanomedicine being pursued today are already close enough to fruition that it is fair to say that their successful development is almost inevitable, and their subsequent incorporation into valuable medical diagnostics or clinical therapeutics is highly likely and this may occur very soon (31).

Introduction of Some important nanomedicines are like Nanopores based, Fullerenes based pharmaceuticals, Nanoparticles, Dendrimer based, Liposomes, Nanoshells and Nanorobotics for delivery of drugs to an appropriate site.

1. Nanopores

Nanopores are the surface perforated with holes and in through the pores while remaining hidden from the immune system.

Similarly, microcapsules containing pig islet cells could be implanted beneath the skin of some diabetes patients that can restore the body’s glucose level. The flow of nanomaterials through the nanopores can also be externally regulated (7). The first artificial voltage gated molecular nanosieve was fabricated by Martin and colleagues (8) in 1995. Martin’s membrane contains an array of cylindrical gold nanotubes with inside diameter as small as 1.6 nm (6). Current research is directed towards reliably fabricating pores with specific diameters and repeatable geometries at high precision (9).

2. Fullerenes based pharmaceuticals

Soluble derivatives of fullerenes such as C55 have shown
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The composition of CdS nanoparticles determined using the spectra obtained by EDAX are shown in figure 1 for the 1st (a) and 2nd (b) method. The spectrums reveal that the synthesized nanoparticles are of cadmium sulphide and also free of any other impurities.
Conclusion

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The future of technology is in some ways easy to predict, computers will become faster, materials will become stronger, and medicine will be cure more diseases. Nanotechnology is a broad interdisciplinary area of research, development and industrial activity that has been growing rapidly worldwide for the past decade it works on the nanometer scale of molecules and atoms, will be a large part of future, enabling great improvements in all technologies.
• **Acknowledgements**

This section should contain a precise and short acknowledgement text.

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We are thankful to UGC for sanctioning the DRS-SAP (IIIrd Phase) to the Department which made it possible to carry out this work.

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<tr>
<th>References</th>
<th>Page 21</th>
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