SYNTHESIS, CHARACTERIZATION AND OPTICAL PROPERTIES OF Mn-DOPED ZnS NANOPARTICLES

By:

MUHAMMAD AKHTAR JAMIL

ID: 13001140001

SUPERVISOR:

DR. SAMMIA SHAHID

DEPARTMENT OF CHEMISTRY

SCHOOL OF SCIENCE

UNIVERSITY OF MANAGEMENT AND TECHNOLOGY, LAHORE, PAKISTAN

2015

SYNTHESIS, CHARACTERIZATION AND OPTICAL PROPERTIES OF Mn-DOPED ZnS NANOPARTICLES

Submitted to University of Management and Technology Lahore

In partial fulfillment of the requirements

For the award of degree of

MASTER OF PHILOSOPHY

IN

CHEMISTRY

BY

MUHAMMAD AKHTAR JAMIL

ID

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SESSION: 2013-2015

DEPARTMENT OF CHEMISTRY

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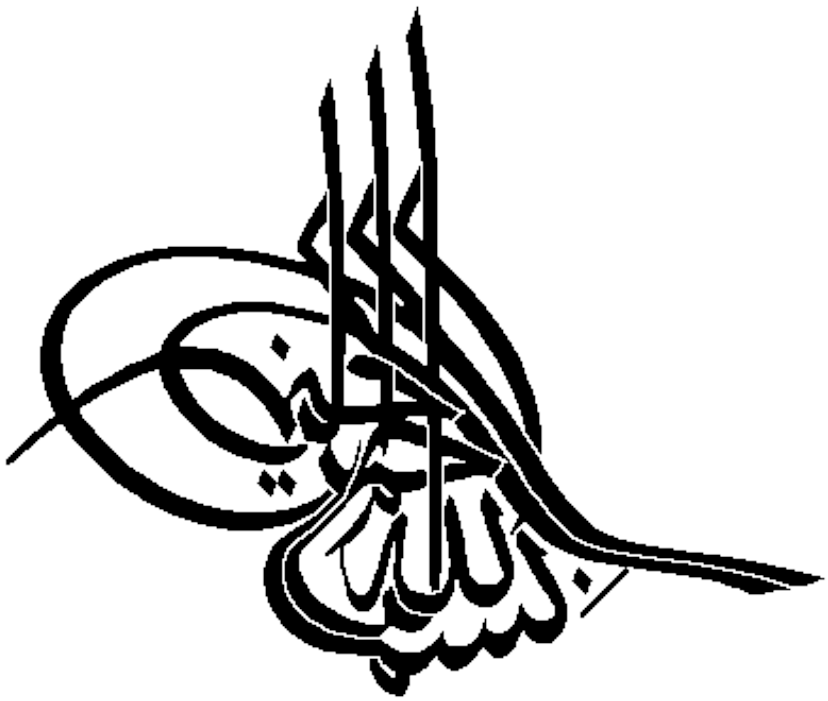
UNIVERSITY OF MANAGEMENT AND TECHNOLOGY, LAHORE, PAKISTAN



In the name of

Allah,

The most Compassionate,

The Ever Merciful

All praise to Allah Almighty

"The Unbelievers say, 'Never to us will come The Hour': say, 'Nay! But most surely, By my Lord, it will come Upon you – by Him Who knows the unseen – **From Whom is not hidden The least little atom In the Heavens or on earth: Nor is there anything less Than that, or greater, but Is in the Record Perspicuous.**'" [Al-Qur'an 34:3]

This verse refers to the Omniscience of ALLAH, His knowledge of all things, hidden or apparent. It then goes further and says that ALLAH is aware of everything, including what is smaller or bigger than the atom. Thus the verse clearly shows that it is possible for something smaller than the atom to exist.

Dr.Zakir Naik

(Quran and Science)

Thesis Similarity Report

DECLARATION

I **Muhammad Akhtar Jamil** S/O **Muhammad Maznoor** ID: **13001140001** Session **2013-2015** hereby declare that the matter printed in the thesis titled "**Synthesis, Characterization and Optical properties of Mn-doped ZnS Nanoparticles."** is my own work and has not been printed, published and submitted as research work, thesis or publication in any form in any University, Research institution etc. in Pakistan or Abroad.

Dated: 10/09/2015 *(Muhammad Akhtar Jamil)*

RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis titled, "Synthesis, Characterization and Optical properties of Mn-doped ZnS nanoparticles" has been carried out and completed by **Muhammad Akhtar Jamil, ID: 13001140001**. The quantum and the quality of the work contained in this thesis is adequate for the award of Degree of MS/M.Phil.

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Supervisor **External Examiner**

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Dr Sammia Shahid
Chairperson,
Department of Chemistry,

UMT, Lahore.

Dr Muhammad Azhar Iqbal
Dean
School of Science,

UMT, Lahore.

Dedication

To My parents,

My Family,

My Teachers,

And

My friends

ACKNOWLEDGEMENT

All praise to Allah Almighty, the alone creator of the whole universe. The whole of the knowledge is fixed to him. What he wants, he delivers us. His mercy and blessings furnished my life and made me able to contribute a little contribution in the field of chemistry. All praise and thanks to Allah Almighty whose exaltation flourished my thoughts.

A sincere thanks to my well disciplined, learned, ever smiling, and honorable research supervisor, Dr Sammia Shahid, chairperson; Department of Chemistry, School of Science and Technology, UMT Lahore. Her caring and constructive suggestions and guidance made me able and confident to perform. Her all time availability and guidance is very well appreciable. I wish to record my sincere thanks and pray for her blessed and healthy life.

A special thanks to Faculty members, Dr Ayesha, Dr Khurram, Dr Sohail and Dr Nouman Rasool. A warm thanks to ever blooming lab staff, Umair and Hafiz Mahir Ali whose presence delight the laboratory atmosphere. Finally a special thanks to library staff, IPC staff and everyone who made it possible to provide us every facility on one click.

Muhammad Akhtar Jamil

ABSTRACT

Nanoparticles constitute dimensions ranges between 1-100nm having broad range of applications. This study covered the ZnS nanoparticles doped with Manganese ions. Chemical precipitation method was used to prepare Mn-doped ZnS nanoparticles. The size of the nanoparticles was confined by the application of capping agent. Ethylene Diammine Tetra acetate was used to restrict the size of Mn doped ZnS nanoparticles. X-

ray diffraction and EDX are the techniques which were employed to locate the exact composition and arrangement of constituent particles and also figure out the presence of impurity. The morphology of Mn-doped ZnS nanoparticles was checked by the application of Scanning Electron Microscopic images. The round and spherical appearance of nanoparticles were encouraged by this method. Grain size was calculated to be 2.51nm and 3.87nm by the application of Scherrer's equation. The result shows that the incorporation of Mn ions into crystal lattice of zinc sulphide alters its behavior. The band gap energy of Mn doped ZnS nanoparticles is suggested by UV-VIS spectrometer and was calculated to be 1.39 ev.

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