Surfactant assisted synthesis of nanocrystalline zno & mno powders and their bioactivites

By: Naila Nazeer

ID: 15005140015

SUPERVISOR:

Dr. Sammia Shahid

DEPARTMENT OF CHEMISTRY
SCHOOL OF SCIENCE
UNIVERSITY OF MANAGEMENT AND TECHNOLOGY,
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NAILA NAZEER

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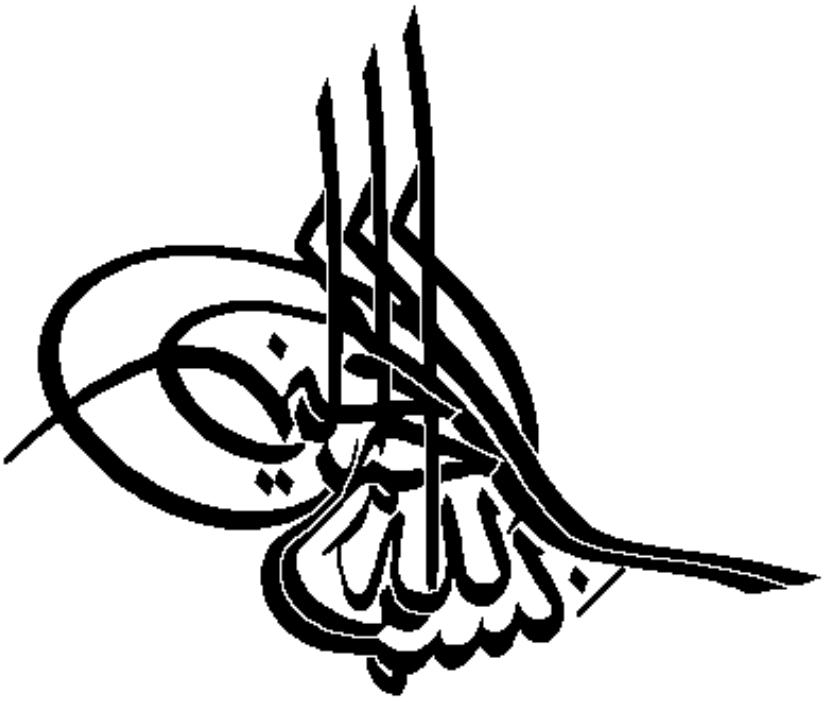

In the name of

Allah,

The most Compassionate,

The most merciful

RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis titled, **"Surfactant Assisted Synthesis of Nanocrystalline ZnO & MnO powders and their bioactivities"** *has* been carried out and completed by, **ID: 15005140015.**

The quantum and the quality of the work contained in this thesis are adequate for the award of Degree of MS/M.Phil.

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Chairperson **Dr Sammia Shahid** **Associate Professor** Department of Chemistry, UMT, Lahore.	**Dean** **Dr Muhammad Azhar Iqbal** **Professor** School of Science, UMT, Lahore.

DECLARATION

I am Naila Nazeer D/O Nazeer -Ud- Din ID: 15005140015 Session **2015-2017** hereby declare that the matter printed in the thesis titled **"Surfactant assisted synthesis of nanocrystalline ZnO & MnO powders and their bioactivities"** 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: _____ _____

(Naila Nazeer)

DEDICATION

This thesis is dedicated to God for giving me the grace, courage, and strength to complete it.

I dedicate this thesis to my beloved parents and respected teachers whose affection, encouragement, and prays make me able to get such success and honor.

I also dedicate this thesis to my brother and sister who giving me permanent support to reach achievements.

ACKNOWLEDGEMENT

First of all I am grateful to ALLAH who in every moment of life with me and helped me in every difficult time, whatever I am today is just because Him.

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Naila Nazeer

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ABSTRACT

Zinc oxide and manganese oxide nanoparticles were synthesized by chemical method using poly ethylene glycol (PEG) as a surfactant, zinc sulphate ($ZnSO_4$. 7 H_2O) & manganese sulphate ($MnSO_4$. H_2O) as a precursor molecules. Different characterization techniques were used for the determination of size and morphology of synthesized nanoparticles such as X-ray diffraction photometer (XRD) and Transmission electron microscopy (TEM). All the results confirmed that the surface of nanoparticles have sufficient compatibility with surfactant. These nanoparticles were tested for its antimicrobial activity against various bacterial strains. The nanoparticles were also used for the removal of toxic organic pollutants such as dye Methylene Blue under UV irradiation. The different operational parameters such as the initial concentration of the dye, weight of the photo catalyst, and pH on the photo catalytic degradation of the dye were investigated. Results proved that both nanoparticles act as very good catalyst for the effective degradation of Methylene Blue in the presence of sunlight. The as synthesized nanoparticles were also found to inhibit the activity of 1, 1-Diphenyl-2 picrylhydrazyl (DPPH) free radicals effectively. This research work revealved a simple and fast method for the preparation of ZnO & MnO nanoparticles with no need for expensive materials or complicated treatments.

1. INTRODUCTION

Nanotechnology

Nanoscale, materials exhibit multiple properties such as visual, electronic, and magnetic properties that diverge extremely from their bulk materials. A characteristic example is gold, yellow noble metal which in the loose form is a non-magnetic. The main characteristics of nanostructured materials allow them to find possible applications in many new and promising fields such as nanofabrication, nanocatalysts, and nanodevices (Wang, 2009).