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# CERTIFICATE

This is to certify that the dissertation entitled "The Impact Of Mn Doped On Structural, Optical, And Magnetic Properties Of CuO Nanoparticles" submitted to Bharathidasan University in partial fulfillment of the requirements for the award of Master of Science in Physics is a record of original project done

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# *PREFACE*

Physics and chemistry of nanostructures or nanophysics and nanochemistry are relatively new areas of science arisen in last decade of past century after discovery of fullerenes and nanotubes, nanoflakes. It is introduction into more extent interdisciplinary integrated modern science known as nanotechnology. Nanotechnology is one of the new technologies, refers to the development of devices, structures and systems whose size varies from 1 to 100 nanometers.

The physical and chemical properties of nanostructures are distinctly different from those of a single molecule and bulk matter with the same chemical composition. These differences between nanomaterials and the molecular, condensed phase materials pertain to the spatial structures and shapes, phase changes, energetic, electronic structure, chemical reactivity, and catalytic properties of large, finite systems, and their assemblies. Some of the important issues in nanoscience relate to size effects, shape phenomena, quantum confinement and response to external electric and optical excitations of individual and coupled finite systems.

The last decade has seen advancement in every side of nanotechnology such as nanoparticles and powders; nanolayers and coats; electrical, optic and mechanical nanodevices; and nanostructured biological materials. Presently, nanotechnology is estimated to be influential in the next 20-30 years, in all fields of science and technology.

Copper oxide is a semiconducting compound with a monoclinic structure. Copper oxide has concerned particular care because it is the simplest member of the family of copper compounds and exhibits a range of potentially useful physical and chemical properties. As an important p-type semiconductor, copper oxide has found many varied applications such as in gas sensors, batteries, catalysis, high-temperature superconductors, solar energy conversion and field emission emitters. 'Cu' has three oxidation states, $Cu^{+}$, $Cu^{2+}$ and $Cu^{3+}$ because of which both hole and electron doping are possible in semiconducting materials. Recently, copper oxide nanoparticles are characterized for its antimicrobial activity.

At this stage of growing knowledge author have shortly outlined the subject and classifications of nanostructures, main principles, methods, techniques, as well as general directions of future perspective research to be a guideline in the modern research are presented in eight chapters,

We can observe a tidal wave of new products which are directly related to nanosciences. Therefore, the basic ideas will be introduced and a brief review of literature outline will be given in **Chapter I.**

**Chapter II** deals with method of preparation of undoped and doped CuO nanoparticles. The various characterization techniques employed in this work and the procedure adopted are also given.

**Chapter III** to **IV** reveals with the synthesis and various characterizations of undoped and different mole concentrations of Mn doped CuO nanoparticles/nanostructures.

**Chapter-V** briefly summarizes the arrived results from the previous chapters.

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# CERTIFICATE

This is to certify that the dissertation entitled "Thermal And Structural Property Of Silver Doped CdO Nanoparticles By Chemical Precipitation Method" submitted to Bharathidasan University in partial fulfillment of the requirements for the award of Master of Science in Physics is a record of original project done by

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# PREFACE

Nanomaterials are cornerstones of nanoscience and nanotechnology. Nanostructures science and technology is a broad and interdisciplinary area of research and development activity that has been growing explosively worldwide in the past few years. It has the potential for revolutionizing the ways in which materials and products are created and the range and nature of functionalities that can be accessed.

The nanocrystalline cadmium oxide (CdO) is an important n–type semiconductor metal oxide with a direct band gap of 2.2–2.7 eV and an indirect band gap of 1.36–1.98 eV. Different values for band gap have been reported in literatures that are attributed to lattice defects originated from different preparation conditions. The unique combination of high electrical conductivity, high carrier concentration and high transparency in the visible range of electromagnetic spectrum has prompted its optoelectronic applications.

The thesis consists of five chapters, the first chapter deals with the introduction about the nanomaterials and cadmium oxide and in the second chapter relevant review of literature was given in detail. The experimental techniques, materials and methods were given in third chapter. In fourth chapter, **Thermal and Structural Property of Silver doped CdO nanoparticles** is discussed. The summary and conclusion are given in the last chapter.

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This is to certify that the dissertation entitled "**Synthesis And Characterization Of Cobalt Ferrite Nanoparticles**" submitted to Bharathidasan University in partial fulfillment of the requirements for the award of Master of Science in Physics is a record of original project done by

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This is to certify that the dissertation entitled "Thermal Stability Of Ba Doped CdO Nanoparticles By Chemical Precipitation Method" submitted to Bharathidasan University in partial fulfillment of the requirements for the award of Master of Science in Physics is a record of original project done by

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Nanomaterials are cornerstones of nanoscience and nanotechnology. Nanostructures science and technology is a broad and interdisciplinary area of research and development activity that has been growing explosively worldwide in the past few years. It has the potential for revolutionizing the ways in which materials and products are created and the range and nature of functionalities that can be accessed.

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The thesis consists of five chapters, the first chapter deals with the introduction about the nanomaterials and cadmium oxide and in the second chapter relevant review of literature was given in detail. The experimental techniques, materials and methods were given in third chapter. In fourth chapter, The thermal stability of Ba doped CdO Nanoparticles are discussed. The summary and conclusion are given in the last chapter.

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The thesis consists of five chapters, the first chapter deals with the introduction about the nanomaterials and cadmium oxide and in the second chapter relevant review of literature was given in detail. The experimental techniques, materials and methods were given in third chapter. In fourth chapter, The enhancement on thermal stability of Sn doped CdO Nanoparticles are discussed. The summary and conclusion are given in the last chapter.

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