PROPERTIES OF NANOSTRUCTURE COPPER (I) IODIDE THIN FILM FOR DYE-SENSITIZED SOLAR CELL

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In the name of Allah, the Beneficent and the Merciful

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ABSTRACT

PROPERTIES OF NANOSTRUCTURE COPPER (I) IODIDE THIN FILM FOR DYE-SENSITIZED SOLAR CELL

This report presents the research on properties of nanostructure Copper (I) Iodide thin films for Dye-Sensitized Solar cell prepared by using sol-gel method at different molarities. The precursor used was chemically pure Copper (I) Iodide powder mixer with Acetonitrile which act as solvent at different molarities such as 0.01 M, 0.03 M and 0.05 M. The CuI thin films were deposited on the substrates by using spin coating technique. The thin films were also prepared at different annealing temperature that is T = 50^0C, 75^0C, 100^0C, 125^0C and 150^0C. The influence of molarities and annealing temperature on the surface morphology, the electrical and the optical properties of the thin films was characterized by using Field Emission Scanning Electron Microscopy (FESEM), solar simulator I-V measurement and UV-VIS spectroscopy respectively. For electrical properties, it was found that resistivity increased when the surface of the CuI thin films started to recombine and melt uniformly, hence the conductivity of CuI thin films decreased. For the surface morphology, the different molarities and annealing temperatures make the CuI particle increased in size, recombined and formed denser film.

Keyword: CuI thin films; Sol-gel; Electrical Properties; Surface Morphology; Optical properties

CHAPTER 1

INTRODUCTION

1.1 Nanostructure thin film

A nanostructure is an object of intermediate size between molecular and microscopic (micrometer-sized) structures. In describing nanostructures it is necessary to differentiate between the numbers of dimensions on the nanoscale [1].

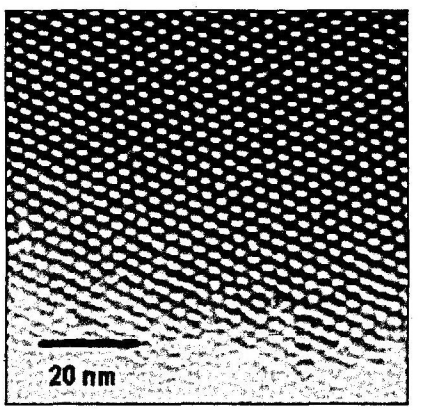

Figure 1.1: Nanostructured particles

Wide band gap nanostructured materials, such as nanowires, nanobelts, and nanorods have received high interest in the recent decade, due to their morphology-related properties, for their potential in building novel functional nanometer-scaled electronic, optoelectronic, electrochemical, and sensor