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**CHARACTERIZATION OF PURE PHASE Zn(II) OXIDE NANOPARTICLES
VIA THERMAL DECOMPOSITION OF TWO ZINC(II) COMPLEXES OF
THE 6,6'-DIMETHYL-2,2'-BIPYRIDINE LIGAND**

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Two zinc(II) complexes $[\text{Zn}(\text{6,6'-dimethyl-2,2'-bipy})\text{Cl}_2]_n$ (**1**) and $[\text{Zn}(\text{6,6'-dimethyl-2,2'-bipy})\text{I}_2]_n$ (**2**) are synthesized from the reaction of the 6,6'-dimethyl-2,2'-bipy ligand with ZnCl_2 and ZnI_2 . Zinc(II) oxide nanoparticles are synthesized by the thermolysis of $[\text{Zn}(\text{6,6'-dimethyl-2,2'-bipy})\text{Cl}_2]_n$ (**1**) and $[\text{Zn}(\text{6,6'-dimethyl-2,2'-bipy})\text{I}_2]_n$ (**2**) at two different temperatures. The ZnO nanoparticles are characterized by X-ray diffraction and scanning electron microscopy (SEM). SEM images show the average size of the ZnO nanoparticles produced of 50 nm and 60 nm in compounds **1** and **2** respectively.

Key words: nanoparticle, 6,6'-dimethyl-2,2'-bipy, Zn(II), surfactant.

INTRODUCTION

ZnO is polar inorganic crystalline material with many applications due to its interesting properties such as nontoxicity, good electrical, optical and piezoelectric behavior, stability in a hydrogen plasma atmosphere and low price [1–10]. ZnO is a well-known semiconductor with a wide direct band gap (3.37 eV), a large excitation binding energy of 60 meV at room temperature [4, 5] and a wide range of applications such as solar cells, luminescent, electrical and acoustic devices, gas and chemical sensors, coatings, catalysts, micro lasers, memory arrays and biomedical applications [6]. Many methods have already been developed to synthesize zinc(II) oxide and sulfide nanocrystals such as vapor phase growth [7], vapor liquid-solid process [2], soft chemical method [9], electrophoretic deposition [10], sol-gel process [11, 12], homogeneous precipitation [13], etc. The use of supramolecular compounds as precursors for the preparation of inorganic nanomaterials such as zinc(II) oxide has not yet been investigated thoroughly. In this paper we describe a simple method for preparing nanoparticles of ZnO with the use of $[\text{Zn}(\text{6,6'-dimethyl-2,2'-bipy})\text{Cl}_2]_n$ (**1**) and $[\text{Zn}(\text{6,6'-dimethyl-2,2'-bipy})\text{I}_2]_n$ (**2**) as precursors.

EXPERIMENTAL

Materials and physical techniques. All reagents and solvents for the synthesis and analysis were commercially available and used as received. X-ray powder diffraction (XRD) measurements were performed using a Philips X'pert diffractometer with monochromated CuK_α radiation ($\lambda = 1.54056 \text{ \AA}$), a step size of 0.05 degrees and a counting time of 5 s per step. The samples were characterized with a scanning electron microscope (SEM) (Philips XL 30) with gold coating.

Preparation of $[\text{Zn}(\text{6,6'-dimethyl-2,2'-bipy})\text{Cl}_2]_n$ (1**).** According to the literature [14], for the preparation of compound $[\text{Zn}(\text{6,6'-dimethyl-2,2'-bipy})\text{Cl}_2]_n$ (**1**), a solution of 6,6'-dimethyl-2,2'-bi-