Abstract: Nanoparticles of ZnO at different sizes were prepared by a novel sonochemical route from zinc acetate and sodium hydroxide without any requirement of calcinations steps at high temperature and without surfactants. Variations in several parameters and their effects on the structural (crystal size and morphology) properties of nanoparticles were investigated. Characterizations were carried out by X-Ray diffraction (XRD), Scanning Electron Microscopy (SEM), Raman spectroscopy, solid state UV and solid state Fluorescent (PL).

Keywords: Nanochemistry, Sonochemistry, Zinc oxide, UV, PL.

1. INTRODUCTION

Nanoparticles are a class of materials with properties distinctively different from their bulk and molecular counterparts and find use in a variety of different areas such as electronic, magnetic and optoelectronic, biomedical, pharmaceutical, cosmetic, energy, environmental, catalytic, and materials applications. Because of the potential of this technology, there have been worldwide increases in investment in nanotechnology research and development. A surfactant-free hydrothermal technique (i.e., high-temperature, high-pressure) has shown to be a suitable way for obtaining materials with small grain size, high specific surface areas, and high crystallinity [1–11]. The sonochemical method has been proven to be a useful technique to obtain novel materials with interesting properties. It is based on acoustic cavitation’s resulting from the continuous formation, growth and implosive collapse of bubbles in a liquid [8]. This method has been used for synthesis of many kinds of nanomaterials so far. Also some researchers have used this wet method to prepare different ZnO nanocrystalline. Instead of aqueous system, ethanol, an organic solvent, was chosen for the present study. Zinc oxide is one of the most promising materials for optoelectronic application because of its wide band-gap (3.3eV) semiconductor materials and large excitation binding energy (60meV) which makes the exciton state stable even at room-temperature. ZnO has been extensively study due to its potential