Synthesis and Characterization of Zinc Oxide Nanostructures Under Different Reaction Conditions

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Abstract

Over the past decade, the synthesis of inorganic nanostructures has become an active area of research due to significant potential applications in catalysis, optoelectronics, microelectronics, magnetic and biology. Among these, zinc oxide is of wide interest as it has many potential applications in electronics, structural and biomaterials. Moreover, it possesses unique properties such as, direct band gap semiconductor (3.37 eV), large exciton binding energy (60meV), piezoelectric property, bio-safe and bio-compatible. In the nano -range, zinc oxide structures are expected to possess interesting properties that are quite different from their bulk counterpart. Up to now, numbers of synthetic approaches have been developed to prepare zinc oxide nanostructures of different morphologies, for instance, solution- based, vapour-based and template-assisted synthesis. [1-5]

In this paper, authors have made the efforts to synthesize zinc oxide nanostructures of diverse morphologies under different reaction conditions using surfactants which were synthesized under ambient conditions. Role of the surfactants in deciding the morphology of the zinc oxide nanosturctures was established through Scanning electron microscopy (SEM), Transmission electron microscopy (TEM) and X-ray diffraction (XRD) techniques. Zinc oxide nanostructures synthesized were found to possess the size ranging from 20 nm to 35 nm. These nanostructures have further been used as reinforcing materials for the preparation of green nanocomposites.

References

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