Editorial
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ZnO Nanoparticle Characterization

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Editorial Note

Nanoparticles have wide applications in semiconductor having a size of about 1-100nm which paid attention towards the unique properties of electrical, mechanical and optical, where the result confined with the effect compares with its bulk properties that could be shown in last several years. In the past years it were signified that the various applications shows their attention towards the study of the characterization, synthesis and properties of different nanoparticles. It is also studied that the some semiconductor nanoparticles like ZnO is used due to its importance in solar energy conversion, UV light-emitting diodes, laser diodes, photo-catalysis and chemical sensors. At a room temperature ZnO shows a wide band gap (3.37 eV) and it has considerably a large excitation binding energy (~60 meV). ZnO nanoparticles are expected to enhance photon-to-electron efficiency, gas sensing and photonic performance due to the surface area increase and quantum confinement effects. To synthesized ZnO nanoparticles we applied various approaches that usually shown the sizes, shapes and homogeneous morphology. Different methods are applied in synthesizing the nanoparticles such as sol-gel, spray pyrolysis, microemulsion techniques, thermal evaporation, mechanical milling, microwave-assisted route and hydrothermal processes. Hence, it keeps the nanoparticles to agglomerate because of their higher surface energy, as given mainly in these methods. As the solution-based approach (co-precipitation) and synthetic ways providing different versatile ways in the low-cost and larger-scale fabrication, not only needs their intricate and costly raw materials. The nanoparticles morphology of this method is taken by several conditional reactions like that the reaction time, pH solution, and reaction temperature and precursor concentration. During the current effort it was using to ZnO nanoparticles synthesis by precipitation method (low temperature), also it was formed by applying the dilute HCl solution (alternative solvent), and in a particle size it was shown great immense effects by using with no calcination. With the synthesizing of ZnO powders through their further variation in heating time was investigated. The structural characteristics such as the presence of chemical bonding, average crystalline size, and morphology structure, particle size and shape were determined by XRD and TEM, respectively.

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