Influence of surfactant on the Optical and Structural Properties of the Synthesized Zinc Oxide Nanomaterials via Thermal Decomposition

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**Abstract**. The current study describes a novel, solvent-free, template solid-state synthesis of Zinc Oxide nanoparticles (NPs). The prepared sample was characterized by X-Ray diffraction (XRD), Rietveld refinement, Field-Emission Scanning Electron Microscopy (FE-SEM), Energy Dispersive X-Ray Spectroscopy (EDX) and UV-Visible spectroscopy. Single-phase crystalline structure of prepared NPs was confirmed using XRD and its Rietveld refinement study, which yielded a good peak fitting between measured and calculated patterns. Chemical composition of the prepared sample was determined using EDX. The size and morphology were evaluated using FESEM which has almost spherical shape. The optical properties of the as-prepared product and their bandgap were determined using UV-Visible spectroscopy. These findings demonstrated that ethylene-glycol (EG) inhibits nanoparticles for coagulate and results in the formation of homogeneous NPs with an optical bandgap of 3.19eV. This study represents an efficient thermal degradation synthesis route for the ZnO NPs with a wide range of potential applications.