

Microwave Assisted Synthesis of Ag/ZnO Sub-Microparticles Deposited on Various Cellulose Surfaces

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Abstract : Zinc oxide sub-micro particles and metallic silver nano particles (Ag/ZnO) were deposited on micro crystalline cellulose surface by a fast, simple and environmentally friendly one-pot microwave assisted solvo thermal synthesis in an open vessel system equipped with an external reflux cooler. In order to increase the interaction between the surface of cellulose and the precipitated Ag/ZnO particles, oxidized form of cellulose (cellulose dialdehyde, DAC) prepared by periodate oxidation of micro crystalline cellulose was added to the reaction mixture of Ag/ZnO particle precursors and untreated micro crystalline cellulose. The structure and morphology of prepared hybrid powder materials were analysed by X-ray diffraction (XRD), energy dispersive analysis (EDX), scanning electron microscopy (SEM) and nitrogen absorption method (BET). Microscopic analysis of the prepared materials treated by ultra-sonication showed that Ag/ZnO particles deposited on the cellulose/DAC sample exhibit increased adhesion to the surface of the cellulose substrate which can be explained by the DAC adhesive effect in comparison with the material prepared without DAC addition.

Keywords : microcrystalline cellulose, microwave synthesis, silver nanoparticles, zinc oxide sub-microparticles, cellulose dialdehyde

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