

Influence of Annealing Temperature on Optical, Anticandidal, Photocatalytic and Dielectric Properties of ZnO/TiO₂ Nanocomposites

Authors : Wasi Khan, Suboohi Shervani, Swaleha Naseem, Mohd. Shueb, J. A. Khan, B. R. Singh, A. H. Naqvi

Abstract : We have successfully synthesized ZnO/TiO₂ nanocomposite using a two-step sol-chemical synthesis method. The influence of annealing temperature on microstructural, optical, anticandidal, photocatalytic activities and dielectric properties were investigated. X-ray diffraction (XRD) and scanning electron microscopy (SEM) show the formation of nanocomposite and uniform surface morphology of all samples. The UV-Vis spectra indicate decrease in band gap energy with increase in annealing temperature. The anticandidal activity of ZnO/TiO₂ nanocomposite was evaluated against MDR *C. albicans* 077. The in-vitro killing assay revealed that the ZnO/TiO₂ nanocomposite efficiently inhibit the growth of the *C. albicans* 077. The nanocomposite also exhibited the photocatalytic activity for the degradation of methyl orange as a function of time at 465 nm wavelength. The electrical behaviour of composite has been studied over a wide range of frequencies at room temperature using complex impedance spectroscopy. The dielectric constants, dielectric loss and ac conductivity (σ_{ac}) were studied as the function of frequency, which have been explained by 'Maxwell Wagner Model'. The data reveals that the dielectric constant and loss ($\tan\delta$) exhibit the normal dielectric behavior and decreases with the increase in frequency.

Keywords : ZnO/TiO₂ nanocomposites, SEM, photocatalytic activity, dielectric properties

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