

Effect of Gamma Irradiation on Structural and Optical Properties of ZnO/Mesoporous Silica Nanocomposite

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Abstract : The effect of gamma ray irradiation on morphology and optical properties of ZnO/Mesoporous silica (MPS) nanocomposite was studied. The ZnO/MPS nanocomposite was irradiated with gamma rays of doses 30, 60, and 90 kGy and dose-rate of irradiation was 0.15 kGy/hour. Irradiated samples are characterized with FE-SEM, FT-IR, UV-vis, and Photoluminescence (PL) spectrometers. SEM pictures showed that morphology changed from spherical to flake like morphology. UV-vis analysis showed that the band gap increased with increase of gamma ray irradiation dose. This enhancement of the band gap is assigned to the depletion of oxygen vacancies with irradiation. The intensity of PL peak decreased gradually with increase of gamma ray irradiation dose. The decrease in PL intensity is attributed to the decrease of oxygen vacancies at the interface due to poor interface and improper passivation between ZnO/MPS.

Keywords : ZnO nanoparticles, nanocomposites, mesoporous silica, photoluminescence

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