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Study of interface interactions in ZnO/Mesoporous silica nanocomposite R.C. REDDY A, SOWRI BABU K, SUJATHA CH, V.G. REDDY K, National Inst. of Technology Warangal (A.P) 506004, India — The Photoluminescence (PL) properties of ZnO/Mesoporous silica (MPS) nanocomposite annealed under different temperatures were studied. A broad PL band at 395 nm has been observed in all samples and analysis was made by using Gaussian fitting. As the temperature increased, emission bands were blue shifted and the relative intensity ratio of the oxygen vacancies at ZnO-SiO_2 interface to the oxygen vacancies in inner ZnO crystallites was increased. The emission peaks at 363 nm and 384 nm are attributed to the near band edge emission (NBE) and to the phonon replica emission. At 550C the exciton confinement effect disappears due to the large amount of surface effects. The influence of porosity of host media on Si-O-Zn cross linking bonds was also investigated. ZnO nanoparticles were loaded into nanocrystalline silica (NCS) and silica gel (SG). The surface area increases monotonously from NCS to MPS through SG. Si-O-Zn cross linking bonds were almost absent in the sample prepared with NCS. It exhibits NBE emission at 360 nm which was found to be absent in other samples prepared with SG and MPS. It was also found that the emission intensity of the samples decreases with aging. This is due to diffusion of oxygen atoms from the atmosphere to interior of the sample.

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