Improvement of Thermal Stability in Hybrid Nanocomposites Using Thermo-luminescent Nanoparticles

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Thermo-luminescence (TL) is the phenomenon in which substances like semiconductors or insulators, irradiated with radiations like X-rays etc. emit light when it is heated gradually. TL may be caused by the recombination of carriers released from the surface states or defect sites by heating. Smaller particles have larger surface/volume ratios and more surface states therefore contain more accessible TL carriers. Furthermore, carrier recombination rate increases upon decreasing size, due to overlap increase between electron and hole wave functions. These two effects may cause TL to increase upon decreasing particle size. ZnO and ZnS being efficient optical materials are expected to show a good thermo-luminescence behavior. The aim of the present investigation is to study the thermo-luminescent characteristics of ZnO and ZnS nanoparticles when doped with transition elements.