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Structural and magnetic properties of magneto-luminescent ZnO-iron oxide core-shell nanoparticles. MAHMUD REAZ, BITHI PAUL, MD ABDULLAH-AL MAMUN, AHMED MAHBUB, ADAM WANEKAYA, Missouri State University, ROBERT DELONG, Kansas State University, KARTIK GHOSH, Missouri State University, MISSOURI STATE UNIVERSITY TEAM, KANSAS STATE UNIVERSITY COLLABORATION — Oxide core-shell nanoparticles have attracted considerable interest for its multifunctional properties with high electron correlation. Luminescent ZnO and ferromagnetic iron oxide have been exploited to develop magneto-luminescent nanomaterials. ZnO-Iron oxide core-shell nanoparticles have been developed using physiochemical method. Magnetic properties have been varied while keeping the luminescence intact in core-shell nanoparticles. Structural and physical properties have been investigated using XRD, TEM, RAMAN, XPS, PL, DLS, and SQUID magnetometer. DLS and TEM data show acceptable dispersion for synthesized core shell nanoparticles. The phase of the shell region has been controlled through annealing the samples at different environment. Rietveld refinement of XRD data clearly show a phase change of iron oxide in the shell region due to annealing. Temperature and field dependent magnetization data establish the ferromagnetism in core-shell nanoparticles. Variation in coercive field and remnant and saturation magnetization further confirms the presence of different iron oxides in the shell region. This research work is supported by National Cancer Institute (1R15 CA139390-01).

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