

Abstract Submitted
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Methodology of Synthesis and Optical Analysis of Rare-Earth Ions (RE^{3+}) in the Polymeric Host PMMA¹ SREERENJINI CHANDRA, JOHN B. GRUBER, DHIRAJ K. SARDAR, University of Texas at San Antonio, WALDEMAR GORSKI COLLABORATION, MAOGEN ZHANG COLLABORATION, JUNHO SHIM COLLABORATION — We report the syntheses of $\text{RE}^{3+}:\text{Y}_2\text{O}_3$ nanoparticles in the polymeric host, PMMA (Poly-Methyl Methacrylate). Addition of adequate amount of surfactant, named Hexadecyl Trimethyl Ammonium Bromide (CTAB) prevents the aggregation of nanoparticles in PMMA. The hydrophobic tails of CTAB micelles link to the hydrocarbon chains of PMMA, forming aggregates which trap the nanoparticles at those positions, thereby giving rise to a uniform distribution of nanoparticles in the polymer-surfactant matrix. Room temperature and the low temperature absorption spectra of various rare-earth samples have been obtained and included for detailed comparison. The Judd-Ofelt intensity parameters, radiative decay rates, branching ratios, and the corresponding radiative lifetimes of excited states are reported. The detailed analysis emphasizes the relevance of embedding the $\text{RE}^{3+}:\text{Y}_2\text{O}_3$ ions in the PMMA host.

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Sreerenjini Chandra
University of Texas at San Antonio

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