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Optical Properties of Nanostructured of Ce-doped Y_2SiO_5[1] LUIZ G. JACOBSOHN, BRYAN L. BENNETT, ROSS E. MUENCHAUSEN, JAMES F. SMITH, STEPHANIE C. SITARZ, MICHAEL W. BLAIR, D. WAYNE COOKE, Los Alamos National Laboratory — Nanophosphors correspond to nanostructured inorganic insulator materials that emit light under particle or electromagnetic radiation excitation. In this work, we present structural and optical characterization of Ce-doped Y_2SiO_5 nanophosphor prepared by the solution combustion method. Characterization by TEM and x-ray diffraction shows that nanopowders are composed of 30-70 nm nanocrystals agglomerated into micron-sized particles. The Ce content was varied up to 10 at.%. Photoluminescence excitation and emission spectra are composed of two major bands centered at 360 and 430 nm, respectively. These results revealed larger Stokes shift for the nanophosphors when compared to bulk. Ce content was also found to affect photoluminescence emission intensity and lifetime. Concentration quenching curve presents a broad maximum centered at 1 at.%. Lifetime measurements showed a continuous decrease from 34 to 21 ns for higher Ce contents. These results confirm the uniqueness nature and properties of nanophosphors, and show that nanophosphors are promising materials for new basic science and technological applications.

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