

Synthesis and Optical Characterization of $Gd_3M_2Al_3O_{12}$: $M=Ce^{+3}, Fe^{+3}$

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Garnets have been receiving attention lately considering to their potential to improve the efficiency of photonic devices. As a host, garnets have exceptional chemical and physical stability, which makes them dependable options for a range of applications in materials science, electronics, and optics. This work examines the structural and optical characteristics of two cubic garnets, $Gd_3Ce_2Al_3O_{12}$ (GCAG) and $Gd_3Fe_2Al_3O_{12}$ (GFAG), through their synthesis using the sol-gel method (sintered at 1100C for GCAG and 950C for GFAG). The microstructural properties were investigated using FTIR spectroscopy. The band gap was determined to be 3.73 eV for GCAG and 2.63eV for GFAG using UV-Vis spectroscopy. Intriguing optical characteristics of GCAG and GFAG are demonstrated by multicolour emission in their Down conversion (DC) emission spectra.

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