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Rare earth - doped barium gallo-germanate glasses and their near-infrared luminescence properties

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Abstract

Near-infrared luminescence properties of Nd^{3+} and Ho^{3+} ions in barium gallo-germanate glasses have been reported. Several spectroscopic parameters for Nd^{3+} and Ho^{3+} ions have been determined from the Judd-Ofelt analysis and absorption/luminescence measurements. Quite large luminescence lifetime, quantum efficiency and stimulated emission cross-section have been obtained for the main $^4F_{3/2} \rightarrow {}^4I_{11/2}$ (Nd^{3+}) and $^5I_7 \rightarrow {}^5I_8$ (Ho^{3+}) laser transitions of rare earths in barium gallo-germanate glasses. It suggests that barium gallo-germanate glass is promising for near-infrared laser application at emission wavelengths 1064 nm (Nd^{3+}) and 2020 nm (Ho^{3+}).

Keywords: germanate glasses; rare earth ions; luminescence; spectroscopic properties

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