MAGNETIC CIRCULAR POLARISATION OF SECONDARY EMISSION SPECTRA IN SINGLE CRYSTALS $Y_3Al_50_{12} : R^{3+}$ (R = Tb, Dy, Er, Ho)

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9.7 cm

Magnetocircular polarization of luminescence (MCPL) in yttrium-aluminum garnet $Y_3Al_50_{12}$ containing threevalent rare-earth (RE)ions Tb, Dy, Er, Ho was investigated in the range of wavelength 450-650 nm for temperatures T=85-300K. MCPL, i.e. circular anisotropy of secondary emission spectra in a magnetic field H caused by polarization of Zeeman components of luminescence lines correspondingly to the radiative 4f - 4f transition appearing in $Y_3Al_50_{12} : R^{3+}$ garnets. It is discovered that, MCPL degree $P = I_+ - I_-/I_+ + I_-$, where $I_\pm$ are the intensities of clockwise and counterclockwise polarized luminescence components, for a number radiative transitions can reach high values ($P \sim 50 - 60\%$ at T=85K, H=10kOe). The behavior of MCPL degree spectra has been interpreted in view of microscopic theory which takes into account the structure of the energy spectrum for RE ion in the garnet structure, and mechanism of "mixing" of electronic states of RE ion in external magnetic field. A possibility of using the effects fot modulation of the threshold generation of lasers to $Y_3Al_50_{12} : R^{3+}$.

13.4 cm

Subject category :

4. Rare Earths and Actinides, Alloys and Compounds

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