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Development of Laser Device Based on Glass Material

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Abstract

Laser gain medium is the main component of laser device system. Utilization of glass materials as host matrix of rare earth (RE) ions have been developed for laser device. Several rare earth ions like Nd^{3+}, Eu^{3+}, Er^{3+}, Sm^{3+} and Dy^{3+} were doped in glass materials with varying concentration. The optimum concentration of RE ions to obtain the luminescence parameters have been carried out. For laser glass of Nd^{3+}, Eu^{3+}, Er^{3+}, Sm^{3+} and Dy^{3+} ions were achieved the optimum concentration range from 0.5 to 1.5 mol.%, 1.0 mol.%, 1.0 to 2.0 mol.%, 0.5 to 2.0 mol.% and 0.5 to 1.0 mol.% respectively. The glass former based on phosphate compounds is the popular composition as host matrix of the RE ions. This is because phosphate glasses have advantages such as high strength, low thermal expansion coefficient, low melting point and minimum optical loss. The maximum emission spectrum of RE doped glasses were centered at wavelength of 1.06 μm, 1.53 μm, 0.61 μm, 0.40 μm, and 0.57 μm for Nd^{3+}, Eu^{3+}, Er^{3+}, Sm^{3+} and Dy^{3+} ions respectively.

Keywords: *Laser medium, rare earth, glasses*

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