

Development of Optical Material Based on Glass Doped Rare Earth for Photonic Devices

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Abstract

Photonic devices such as laser diodes, light-emitting diodes, solar and photovoltaic cells, displays and optical amplifier are widely used in human life. They can create, manipulate or detect light. Glass such as phosphate, borate, and tellurite doped rare earth have been attractive to be investigated due to their characteristic. They can absorb ultraviolet to infrared wavelength. They can also emit visible wavelength under ultraviolet excitation. Glass doped Sm^{3+} ion can emit orange region excited by 402 nm. Glass doped Dy^{3+} ion can emit white or yellow region under excitation of 388 nm. Meanwhile, Eu^{3+} ion in the glass system which is excited by 465 nm can emit red wavelength. The addition of modifier material improves the glass structure and the emission intensity. They change the color of light emission. In this paper, the properties of glass doped rare earth including physical, optical, and luminescence were investigated for understanding the material behaviour. From the investigation, glass doped rare earth was the suitable candidate for optical material and can be potentially used in photonic devices.

Keywords: glass, rare earth, optical material.