



Contribution ID: 72

Type: Oral Presentation

Spectroscopic investigation of Tm³⁺ containing Lithium borate glasses

Friday, 8 July 2016 11:10 (20 minutes)

Abstract content (Max 300 words) Formatting & Special chars

Rare earth (RE) oxides are currently used for a variety of optical applications due to their interesting 4f and 5d orbital properties. Tm₂O₃ RE oxide is very useful in biomedical applications such as tissue welding and ablation. Excitation at around 800 nm of materials doped with Tm₂O₃ generates emission bands near 1460 and 1860 nm. This feature allows it to be utilized for numerous applications. The broad emission around 1460 nm is useful for the development of an optical amplifier for uses in fiber-optic communication. By using the 1860 nm emission of Tm³⁺ it is possible to build a mid -infrared laser. Glass hosts can be utilized to attain both these properties. Among the available potential hosts, the lithium borate glasses are very interesting due to their easy formability, wide range of composition and good rare earth solubility. In the present study we investigated the spectroscopic properties of Tm³⁺ containing lithium borate glasses as a function of Tm³⁺ concentration. The physical properties were analyzed by using the density and molar volume of the glasses. The Judd-Ofelt theory were used to analyze the experimental data. The main focus of the present study was to study the effect of ion concentration on the two emission bands with peaks at 1460 nm (3F₄ level) and 1860 nm (3H₄ level).

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Level for award (Hons, MSc, PhD, N/A)?

n/a

Main supervisor (name and email) and his / her institution

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Session Classification: Division for Physics of Condensed Matter and Materials (1)

Track Classification: Track A - Division for Physics of Condensed Matter and Materials