

Effect of MoO₃ Content on Structural, Thermal and Luminescent Properties of Potassium Phosphomolybdate Glasses

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Optical properties of various transition-metal ions doped glasses have been under investigation in recent years in view of their technological applications, especially in lasers, phosphors, solar energy converters, plasma display panels and in a number of electronic devices. Molybdenum-containing glasses possess a variety of specific features, which arouse interest in view of their applications. It is known that the addition of MoO₃ enhances the semi-conducting properties of the host glass because of the different valence states of molybdenum. Moreover, there are some data on different coordination environment of molybdenum within a vitreous host. The ratio of different oxygen coordination numbers of molybdenum and the polarizability of the oxygen surrounding the paramagnetic ions depends on the presence of bridging and non-bridging oxygens and on the change of the coordination number.

On the other hand, the MoO₃ and Bi₂O₃ oxides appeared as non-conventional network formers because of the participation of MoO₄, MoO₆ and BiO₆ groups in the formation of the glass network. The bismuth phosphate-based glasses have very wide applications for optoelectronic materials such as laser host fibers for communications and photonic switches.

Herein, the series of glasses P₂O₅-MoO₃-Bi₂O₃-K₂O has been obtained by conventional melt approach. The influence of MoO₃ content in a range of 5,0 –30,0 % mol has been studied in a light of structural and spectroscopic properties. Moreover, Eu(III) doping has been used as a structural probe for additional luminescent estimation of coordination environment of Mo within the glassy network.

Type of presence

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