2nd International Karatekin Science and Technology Conference

December 21-22, 2023 – Çankırı, Turkiye

IKSTC2nd 2023

https://ikstc.karatekin.edu.tr/

FUNDAMENTAL PERSPECTIVE OF THE OXIDE GLASS MATERIAL: Mo^{3+} DOPED PHOSPHATE BASED OPTICAL GLASSES FOR PHOTONIC APPLICATIONS

İdris Kabalcı*

Faculty of Engineering and Natural Science, Electrical and Electronics Engineering, Uşak University, Uşak, Türkiye

Faculty of Engineering, Electrical and Electronics Engineering, Şırnak University, Şırnak, Türkiye

0000-0001-9398-0156

Lidiya Ungarbaevna

Faculty of Science and Technology, Fundamental Department, Yessenov University, Aktau, Kazakistan

0000-0002-1692-4350

FUNDAMENTAL PERSPECTIVE OF THE OXIDE GLASS MATERIAL: Mo^{3+} DOPED PHOSPHATE BASED OPTICAL GLASSES FOR PHOTONIC APPLICATIONS

Today's advanced electronic-based technologies have begun to provide incredible convenience in the daily life of the individual person. For this purpose, the potential for the use of optical glass materials is rapidly increasing in areas such as intercontinental communication, intercity information exchange and data transmission, modern developments in the health sector and energy sources for space technologies [1,3]. For this reason, new applications are emerging in research on the structural, optical and thermal properties of oxidized glass materials, which have an important place among optical glass materials. Thermal and optical properties are usually determined by considering the Kissinger approximation and Judd-Ofelt theory [4,5]. Therefore, thermal parameters, production costs, optical and structural properties of oxidized glass materials attract attention, depending on the industrial requirements in their usage areas. In this research, the production, optical and photoluminescence properties of Mo^{3+} doped phosphate glass materials from a set of oxidized glass materials were investigated [6,7].

[1] Zschokke I., (1986). Optical Spectroscopy of Glasses. Dordrecht, Holland: D. Reidel Publishing Company,

[2] Wen H., Cheng BM., Tanner PA., (2017). Optical properties of selected 4d and 5d transition metal ion-doped glasses. *Royal Society of Chemistry Adv*.,7, 26411.

[3] Ghauri, M. A., Siddiqi, S. A., Ashiq, M. G. B. (2014). Band Gap Measurement of $ZnO–MoO_3–P_2O_5$ Glasses by Photoconductivity. *Glass Physics and Chemistry,* Vol. 40, No. 2, 151–156.

[4] Kissinger, H.E., (1957). Reaction kinetics in differential thermal analysis. *Anal. Chem*. 29, 1702–1706.

[5] Sennaroğlu, A., Kabalcı, İ., Kurt, A., Demirbaş, U., Özen, G. (2006). Spectroscopic properties of Tm^{3+}: $TeO_2–PbF_2$ glasses. *Journal of Luminescence* 116, 79-86.

[6] Yuan, J., Yang, Q., Chen, D. D., Qian, Q., Shen, S. X., Zhang, Q. Y., Jiang, Z. H. (2012). Compositional effect of WO_3, MoO_3, and P_2O_5 on Raman spectroscopy of tellurite glass for broadband and high gain Raman amplifier. *Journal of Applied Physics*, 111, 103511.

[7] Naresh, P., Naga Raju G., Srinivas Reddy M., Venkatappa Rao T., Kityk I.V., Veeraiah, N. (2014). Dielectric and spectroscopic features of $ZnO–ZnF_2–B_2O_3$:MoO_3 glass ceramic—a possible material for plasma display panels. *Journal of Mater Sci: Mater Electron*, 25:4902–4915.

Keywords: Optical glass, Optical fiber, Absorption, Photoluminescence

* Corresponding author. *e-mail address: idris.kabalci@usak.edu.tr*