Contribution ID: **58** Type: **Poster**

Tetragonal scheelite structure and bright luminescence of NaBi(MoO4)2 doped with europium(III) Single Crystals

Friday, November 8, 2024 4:03 PM (3 minutes)

Materials based on double molybdates have a promising application in the field of optoelectronic devices[1] due to their physical and chemical properties, and they also exhibit the phenomenon of upconversion, which is widely used in diagnostics, therapy, sensors, solar cells, photocalysis, bio-imaging[2].
The main goal is to obtain pure NaBi(MoO4)2 and NaBi0.5Eu0.5(MoO4)2 with tetragonal scheelite structure, without impurities of molybdenum (VI) oxide. The presence of this type of impurity makes it impossible to accurately determine the physical and chemical properties of compounds of this type, such as luminescence, conductivity, etc.
In this work, we obtained pure compounds NaBi(MoO4)2 and NaBi0.5Eu0.5(MoO4)2 and confirmed their tetragonal scheelite structure and the absence of impurities using the X-ray method, as well as infrared spectroscopy.
[1] Guler, I., Isik, M., & Gasanly, N. (2024). Growth and optical properties of (Na0. 5Bi0. 5)(Mo1− x Wx)O4 (x= 0.25) single crystal: a potential candidate for optoelectronic devices. Optical and Quantum Electronics, 56(1), 17.
[2] Kunchala, R. K., Kalia, R., & Naidu, B. S. (2020). Upconversion luminescence properties of NaBi (MoO4)2: Ln3+, Yb3+ (Ln= Er, Ho) nanomaterials synthesized at room temperature. Ceramics International, 46(11), 18614-18622.

Type of presence

Presence at Taras Shevchenko National University

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Session Classification: Poster Session