

MS15-P11 | SYNTHESIS, CRYSTAL STRUCTURES AND THERMAL EXPANSION OF NOVEL LUTETIUM-BARIUM BORATES

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The search for new RGB phosphors for wLED is of important interest nowadays. Rare- and alkaline-earth borates have attracted the attention of researchers due to luminescence makes them prospective phosphors, scintillators. Five (Lu,Ba)-borates are known: $\text{LuBa}_3\text{B}_3\text{O}_9$, $\text{LuBa}_3\text{B}_9\text{O}_{18}$ and recently obtained $\text{Lu}_5\text{Ba}_2\text{B}_5\text{O}_{17}$ (Hermus *et al.*, 2017), $\text{Lu}_2\text{Ba}_3\text{B}_6\text{O}_{15}$ (Biryukov *et al.*, 2019) and $\text{Lu}_5\text{Ba}_6\text{B}_9\text{O}_{27}$ (Filatov *et al.*, 2019). Partially substituted by Ce, Yb and Eu, the borates exhibit good and even excellent luminescence ($\text{Lu}_2\text{Ba}_3\text{B}_6\text{O}_{15}:\text{Ce,Tb}$).

This work is devoted to synthesis of $\text{Lu}_5\text{Ba}_6\text{B}_9\text{O}_{27}$ and $\text{Lu}_2\text{Ba}_3\text{B}_6\text{O}_{15}$, its structure determination from single-crystal, powder XRD data, investigation of thermal properties of these borates and $\text{LuBa}_3\text{B}_9\text{O}_{18}$ using TG, DSC, HTXRD. The $\text{Lu}_5\text{Ba}_6\text{B}_9\text{O}_{27}$ structure is composed of the BO_3 triangles, the cubic $\text{Lu}_2\text{Ba}_3\text{B}_6\text{O}_{15}$ is built from the B_2O_5 groups, $\text{LuBa}_3\text{B}_9\text{O}_{18}$ structure - from the B_3O_6 groups. The thermal expansion is considered as a function of not only polyanions contribution but also of cations one.

This work was supported by the Russian Foundation For Basic Research (grant No. 18-29-12106).