

09

Synthesis and Testing of $\text{BaZrGe}_3\text{O}_9:\text{Mn}^{4+}$ for Application as a Red-Emitting Phosphor

© X. Wang¹, M. Zhai¹, K.V. Ivanovskikh², H. Guo¹, P. Huang¹, C. Cui¹, L. Wang¹, Q. Shi^{1,¶}

¹ College of Physics and Optoelectronics, Taiyuan University of Technology, Taiyuan, 030024 China

² Department of Experimental Physics, Ural Federal University, Ekaterinburg, 620002 Russia

¶ E-mail: shiqiufeng@tyut.edu.cn

Received June 16, 2022

Revised June 16, 2022

Accepted June 19, 2022

A series of novel red-emitting phosphors $\text{BaZrGe}_3\text{O}_9:\text{Mn}^{4+}$ (BZG: Mn^{4+}) were synthesized through high-temperature solid-state reaction method in order to explore their capabilities for application as red-emitting phosphors. The phosphors were characterized by X-ray diffraction, photoluminescence spectra, and decay curve measurements at the temperature ranging from 80 to 500 K. The luminescence intensity increases to maximum at doping concentration of 0.2 mol.%, and then decreases with concentration. Serious thermal quenching was also revealed.

Keywords: red-emitting phosphor, germanate, Mn^{4+} , concentration quenching, thermal stability.