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Luminescent properties of monoclinic zirconium oxide

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LUMINESCENT PROPERTIES OF MONOCLINIC ZIRCONIUM OXIDES.V. Nikiforov¹, V.S. Kortov¹, M.G. Kazantseva¹,K.A. Petrovykh^{1,2}¹Ural Federal University, Ekaterinburg, Russia²Institute of Solid State Chemistry, Ural Branch of RAS, Ekaterinburg, Russia

Abstract – Luminescent properties of monoclinic zirconium oxide, obtained by using compacting microcrystalline powder, were studied. The maximums of bands in the photoluminescence (PL) spectrum, PL excitation spectrum and pulse cathodoluminescence were determined. Thermal quenching of PL in the samples under study was found in the 480 nm band, different methods were used to define its parameters. Peaks at 125 °C and 225 °C, as well as thermoluminescence (TL) of shallow traps are observed on the TL glow curve, when the samples are exposed to a pulsed electron beam with the energy of 130 keV. The TL yield of the dominant peak at 125 °C decreases with an increasing heating rate. Analysis of the peak shape, variation of the heating rate, analysis of isothermal decay was used to define kinetic parameters of the TL of this peak. The parameters were specified by the method of curve fitting, taking into account thermal quenching.

Keywords: Thermoluminescence; Zirconium oxide; Thermal quenching; Pulse Electron beam

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