

Temperature dependence of $4f^{n-1} 5d^1 \rightarrow 4f^n$ luminescence of Ce^{3+} and Pr^{3+} ions in Sr_2GeO_4 host.

Autorzy

Karolina Fiączyk

Shun Omagari

Andries Meijerink

Eugeniusz Zych

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Streszczenie

Photoluminescence of Ce^{3+} - and Pr^{3+} -activated Sr_2GeO_4 powders was measured between 17 and 600K. For both ions strong $4f^{n-1}5d^1 \rightarrow 4f^n$ (d-f) emission is observed at low temperatures, around 410nm (Ce^{3+}) and 280nm (Pr^{3+}). The Ce^{3+} d-f emission quenches starting at 150K and disappearing completely just above room temperature. Pr^{3+} d-f luminescence shows an onset of quenching also around 150K and disappears completely between 250 and 300K. For Pr^{3+} quenching of the d-f emission was connected with an increasing intensity of the 3P_0 luminescence at first and 1D_2 emission at even higher temperatures. Both these $4f^n \rightarrow 4f^n$ emissions were observed up to 600K. Based on the similar quenching temperatures, thermally stimulated photoionization of the 5d electrons from 5d level of Ce^{3+} or Pr^{3+} to the conduction band is proposed as the most probable mechanism for quenching of the d-f emissions.

Słowa kluczowe

Thermal quenching, d $\rightarrow$ f luminescence, Strontium germanate, Pr^{3+} , Ce^{3+}

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