

Spectroscopic properties of U^{3+} ions in $ZnCl_2$ -based glass.

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Streszczenie

A $ZnCl_2$ -based glass sample doped with U^{3+} ions was prepared by mixing $ZnCl_2$, $PbBr_2$, KBr and UCl_3 in an appropriate stoichiometry and by melting the mixture at $450^\circ C$ under vacuum. Absorption and luminescence spectra of the sample have been measured at 300 and 15 K, respectively. The absorption spectrum is typical for U^{3+} complex compounds in non-aqueous solutions. The emission bands observed at 14 250, 13 100, 8100, 7000 and 4170 cm^{-1} have been assigned to the transitions from the lowest components of the $^4F_{9/2}$, $^4G_{7/2}$, $^4I_{13/2}$, $^4F_{3/2}$ and $^4I_{11/2}$ multiplets to the Stark components of the $^4I_{9/2}$ ground multiplet. Decay curves of the visible emission were strongly non-exponential. The decay time of the longest component of the decay profile was found to be equal to 7 μs and 800 ns at 10 and 300 K, respectively. Good agreement between the observed and calculated oscillator strengths has been obtained in an analysis of the f–f band intensities based on the Judd–Ofelt theory.

Słowa kluczowe

Uranium(III), Glass, Spectroscopy, Intensity analysis

Adres publiczny

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