

Synthesis and luminescence properties of BaHfO₃:Pr ceramics.

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Streszczenie

BaHfO₃ sintered ceramic scintillators doped with various Pr concentrations (0-1mol%) were synthesized at 1700C in N₂-H₂ atmosphere. XRD, SEM and photo-luminescent techniques at various temperatures (40K to 550K) were employed to reveal properties of the BaHfO₃:Pr ceramics. Results of spectroscopic investigation indicate that the luminescence is connected almost exclusively with decay of the ³P₀ level, while the emission from ¹D₂ is hardly seen even for higher Pr³⁺ concentrations. However, the intrinsic emission of BaHfO₃ matrix, related with defects or impurities, seems to compete with the emission of Pr³⁺ ions. The ³P₀ luminescence decays give time constant of about 25-32μs in the 40-550K range of temperatures, while the ¹D₂ decay time depends on the dopant concentration and gets shorter above 300K for 1% specimen due to a cross relaxation process between Pr³⁺ ions.

Słowa kluczowe

Barium hafnate, Pr³⁺ + luminescence, Time-resolved spectroscopy

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