

Pulsed electron-nuclear double resonance diagnostics of Ce³⁺ emitters in scintillating garnets

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Abstract

© 2016 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim Pulsed electron paramagnetic resonance (EPR) and pulsed electron-nuclear double resonance (ENDOR) techniques have been applied to study the environment of luminescent Ce³⁺ ions in garnet based scintillator powders and ceramics. The presence of aluminum and gallium isotopes with large nuclear magnetic and quadrupole moments in the nearest neighborhood of the Ce³⁺ ion allows for the use of the hyperfine and quadrupole interactions with these ions for determination of the unpaired electron spatial distribution and the definition of the electric field gradient at the aluminum and gallium sites. Pulsed EPR and ENDOR techniques made it possible to study the coherent properties of the Ce³⁺ spin system in garnet powders and ceramics, which is important for spin manipulation on Ce³⁺ centers.

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Keywords

ceramics, cerium, emitters, garnets, pulsed electron paramagnetic resonance, pulsed electron-nuclear double resonance

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