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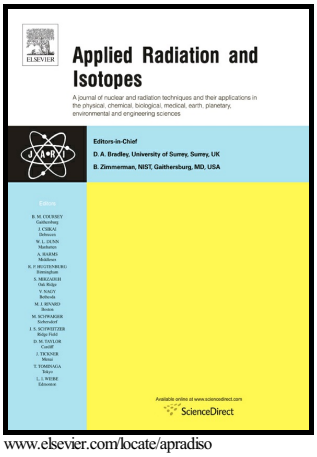

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Synthesis of β-$Ca_2P_2O_7$:Tb^{3+} to gamma radiation detection by thermoluminescence

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Abstract

In this work, luminescent emissions of beta-calcium pyrophosphate doped with terbium ions (β-$Ca_2P_2O_7$:Tb^{3+}) were studied. The $Ca_2P_2O_7$:Tb^{3+} powders were prepared by precipitation and annealed at 900 °C for 2 hrs was applied on the powders to observe the beta phase. Radioluminescence measurements showed emission bands related with $^5D_3$ ($^5D_4$)→^7F_J transitions of Tb^{3+} ions. Three overlapped peaks at 126, 165 and 220 °C were observed in thermoluminescence response. A linear TL dose-response in the range of 0.2 Gy to 10 Gy and an acceptable TL reproducibility were showed by the β-$Ca_2P_2O_7$:Tb^{3+} samples exposed to ^{60}Co gamma radiation. The TL glow curves were analyzed by Initial