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Teste **Abstract: 89-2**

89-2 COMPARATIVE ANALYSIS OF DOSIMETRIC CHARACTERISTICS IN CaSO4:Mn,Tb PHOSPHORS SYNTHESIZED THROUGH VARIOUS PRODUCTION ROUTES

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Abstract:

The luminescence of crystalline compounds can be used to monitor various physical phenomena, including doses of ionizing radiation. Optically stimulated luminescence (OSL) and thermoluminescence (TL) have been successfully employed in dosimetry. Considering the importance of various research efforts focused on characterisation and development of new materials for luminescent dosimetry, as well as exploring practical applications for existing materials, this study is part of an ongoing experimental series initiated by our research group, expanding upon the foundational work of Silva et al. (2022). We synthesized a series of new $CaSO_4$:Mn,Tb phosphors using four distinct routes: solid-state diffusion, precipitation, sol-gel methods, and the slow evaporation route. Analysis of pellets produced by incorporating Teflon into the phosphors, showed that the synthesis method significantly influences the luminescent properties of the phosphors. Specifically, the slow evaporation route, followed by solid-state synthesis, yielded the highest intensity of TL glow curves, which were characterized using Schott BG-39 and Hoya U-340 bandpass filters to control wavelengths. Different emission curve behaviors for TL were observed. In the OSL analyses, obtained with continuous intensity optical stimulation and a 40-second integration time, all samples exhibited an exponential decrease in OSL signal as the charge traps were emptied. The $CaSO_4$:Mn,Tb phosphor produced via the sol-gel route followed by slow evaporation showed the highest OSL intensity, followed by those produced via solid-state synthesis and precipitation. However, the high variation coefficient (CV%) in the TL/OSL responses of the phosphor produced by the sol-gel route, compared to the other syntheses (CV < 10%), makes it unsuitable for practical applications, indicating a need for optimization of production parameters

Keywords:

CaSO4:Mn,Tb, glow curves, OSL analyses, Luminescent dosimeters