



Title: PL and TSL properties of tin-doped zinc sodium phosphate glasses

Authors: Shotaro Hirano, Naoki Kawano, Go Okada, Noriaki Kawaguchi, Takayuki Yanagida

Affiliation: Nara Institute of Science and Technology

Keywords: phosphate glass,  $ns^2$ -ion, PL, TSL, dosimeter

#### Abstract

Photoluminescence (PL) and thermally-stimulated luminescence (TSL) properties of Sn-doped zinc sodium phosphate glasses were evaluated. We synthesized the glass samples by the conventional melt-quenching method under ambient atmosphere. The glasses were highly transparent in 400-2700 nm. Depending on the concentration of Sn, PL quantum yield ( $QY$ ) ranged from 7.7 to 25.7%, and the  $PLQY$  increased with increasing the concentration of Sn. The Sn-doped samples showed PL with a broad feature due to the  $5sp \rightarrow 5s^2$  transition of  $Sn^{2+}$ . The PL decay constants were 4.72-4.83  $\mu s$ , and any dependence on the concentration of Sn was not observed. The glasses showed intense TSL, and the glow curves had a broad feature peaking at 110°C. Among the present samples, the 0.5% Sn-doped sample exhibited the highest sensitivity with a good linearity over 5 orders of magnitude (0.1-10000 mGy). In addition, the TSL fading characteristics were evaluated, and the integrated TSL intensities after two days were 5.5% (undoped), 41% (Sn:0.1%), 38% (Sn:0.2%), 40% (Sn:0.5%) and 35% (Sn:1.0%), respectively.

Download English Version:

<https://daneshyari.com/en/article/8249833>

Download Persian Version:

<https://daneshyari.com/article/8249833>

[Daneshyari.com](https://daneshyari.com)