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## Thermoluminescence Response of Germanium-Doped Optical Fibers to X-Ray Irradiation

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### Abstract

We present the characteristics of the thermoluminescence (TL) response of Ge-doped optical fibers with various energies and exposures of photon irradiation. To investigate the Ge-doped SiO<sub>2</sub> as an efficient TL material, the TL responses are compared with commercially available standard TLD100 media. The Ge-doped optical fiber and TLD100 are placed in gelatin capsules and irradiated with x-ray using a Toshiba model KXO-15R x-ray generator. The Ge-doped fiber and TLD-100 show linear response as a function of current and time using x-ray photon of energy 60, 80 and 100 kV. When irradiated with 60, 80 and 100 kV x-ray energy at various currents (mA), tube distance (cm) and exposure time (second) ranges, TLD100 media provide a TL yield up to two times that of Ge-doped fibers. The energy response of the Ge-doped fibers is linear and similar over the 60-100 kV energy range, and its sensitivity is 0.39 +/- 0.05 of the TLD100 media. The glow curves of TLD 100 and doped optical fiber are also compared.

### Keywords

**Keywords Plus:** ELECTRON IRRADIATIONS; PHOTON; RADIATION

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