

Dosimetric Properties of the Newly Developed LiF : Mg,Cu,Si TL Material

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Abstract

The dosimetric properties of the newly developed TL material (LiF:Mg,Cu,Si) in KAERI were investigated. The sensitivity of this new TL detector was about 20 times higher than that of the TLD-100 by light integration. The residual signal of this newly developed TL detector was significantly lower than that of GR-200A and KLT-300. The energy response of the detector was performed for photon energies from 20 to 662 keV. It was observed that the maximum response was 1.0387 at 35 keV and the minimum response was 0.791 at 117 keV. The reusability of the detector was also studied. The coefficient of variation for each detector and for all detectors collectively did not exceed 0.021 and 0.0039 respectively, whereas IEC standard requires that the coefficient of variation shall not exceed 0.075. Hence, the reusability of the new TL detector sufficiently satisfied the IEC requirements. Detection threshold of the TL detector was measured and found to be 1.55 μ Gy by Harshaw 4500 TLD reader.

Keywords: LiF:Mg,Cu,Si; Thermoluminescence; TLD