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PAPER TITLE THE INFLUENCE OF TL DOSIMETRY SYSTEMS ON SOME
HIGH SENSITIVE SOLID TL DETECTORS

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ABSTRACT (See instructions overleaf)

The expansion of the number of TL materials currently available that exhibit ultra high sensitivity, such as LiF:Mg,Cu,P (GR-200A), CaSO₄:Dy (TLD-2000H), CaSO₄:Tm (TLD-2001H), and Al₂O₃:C (TLD-500K), make it important to study and compare their individual TL properties under the optimal measurement procedures.

The behaviour of hypersensitive thermoluminescent phosphors in form of solid TL detectors has been studied under two basically types of TL Dosimetry Systems based on different heating methods, planchet, and hot nitrogen gas heating. Also, the different types of TLD systems may differ markedly in their spectral light detection responses, i.e. the spectral response of photomultiplier depends on the composition of the photocathode, on the special transmission of the tube window, as well as on optical filter built in. Since the spectral emission of the various TL materials spans from 300nm to 600nm, the investigation of the influence of the measurement conditions on the main characteristics of the investigated phosphors is also analyzed.

This study shows that the main characteristics of examined TL materials including sensitivity, reproducibility, linearity, minimum detectability, repeatability, residual dose, ambient light sensitivity, stability of glow curve shape, fading, dependence on the heating rate, etc., support the importance of achieving compatibility between the TL material and the type of Thermoluminescence Dosimetry System used.