

THERMOLUMINESCENT SIGNAL FADING OF ENCAPSULATED LiF:Mg,Ti DETECTORS IN PTFE-Teflon[®]

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Abstract – Fading is a process when the latent information of a detector is unintentionally lost mainly due to the thermal influence. Thermoluminescent (TL) detectors have different sensitivities as far as the fading effect. Encapsulated TL detectors mounted within shielded filter holders are used during the personal monitoring of occupationally exposed persons in R. Macedonia. PTFE-Teflon[®] polymer is an example of encapsulation material that has a temperature resistance and it allows the luminescence signal to pass through. Since the encapsulated TL detectors cannot be submitted to annealing treatment in an oven, another fading reduction method is needed. The TL evaluation method suggested in this work is based on a specific glow-curve region. Irradiations were conducted using ⁹⁰Sr/⁹⁰Y source. Post-irradiation fade investigations were conducted for evaluation periods that varied up to 4 months. Two areas of the TL glow-curve were selected with the WimRems software. They correspond to the high and the low fading emission peaks (the lower temperature peaks display a greater degree of thermal fading than the higher temperature peaks). Post-irradiation fade is a contributing factor that affects the response of a thermoluminescent (TL) phosphor as a function of time.

PTFE – Polytetrafluoroethylene most well known by the DuPont brand name Teflon[®]