DEVELOPMENT OF A $CaSO_4$:Dy DOSIMETER

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Polycrystalline pellets of a cold pressed mixture of $CaSO_4$:Dy and NaCl powders was developed and studied with the purpose of obtaining a personnal thermoluminescent (TL) dosimeter for radiation monitoring. These dosimeters in the form of small discs (6mm diameter, 1mm thick), are made of laboratory grown $CaSO_4$:Dy (0.1% Weight) as an active TL component and NaCl as a binder a ratio of 1:2.

In order to obtain TL single crystals of $CaSO_4$:Dy of optical quality for dosimetric and physical studies, a new preparation method was developed. Single crystals with dimensions of 5.5x 3.5 x 1.0mm were obtained and analysed by X-ray diffraction method (Laue), that confirmed the monocrystallinity of the samples.

Detailed studies on the dosimetric characteristics such as reproducibility, response linearity, fading, reusability, effect of ambient light and energy dependence were carried out and will be presented. The effect of moisture was also investigated.

A filter combination providing an energy independent response from 20 keV to 1.25 MeV was obtained. The final TL badge consists of four dosimeters sealed between two thin plastic sheets under the following filter conditions: open window, 3mm thick plastic; 3mm thick plastic together with 1mm thick lead, 3mm thick plastic together with 0.8mm thick lead which has a

2mm diameter central hole. This last filter will provide the energy independent exposure. The combination of these four filters allows the energy determination for exposure to an unknown source.

Field trials of this dosimeter and Intercomparison data have shown very good results