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**BOOK OF ABSTRACTS**



## **THERMOLUMINESCENCE (TL) DOSE RESPONSE CHARACTERISTICS AND REUSABILITY PROPERTIES OF NATURAL MUSCOVITE MINERAL**

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In this study Thermoluminescence (TL) glow curves of natural Muscovite mineral were studied in respect of dose response and reusability properties. Muscovite is a common rock-forming silicate mineral within the mica group, and it is a secondary mineral result from the alteration of quartz, feldspar etc. that are used as natural TL dosimeter. It is generally found in white colour, classified according to crystallographic criteria in dioctahedral, and has the approximate chemical formula  $KAl_2(Si_3Al)O_{10}(OH,F)_2$ . All TL measurements were carried out by using Lexsyg Smart Thermoluminescence Reader which has Sr-90 beta source with 1.85Gy activity. 3 cups (each 20 mg) of Muscovite powder samples have been exposed to beta radiation between 0.115-414Gy for the part of dose response experiment, detected with the wideband blue filter and heated from room temperature (RT) to 400°C with the heating rate 2°C/s for TL readout. Results showed that glow curve had a mean peak at around 230°C and two shoulder peaks at around 84°C and 164°C for the relatively low doses i.e. between 3.45-138 Gy. In addition, mean peak of glow curve shifted to lower temperatures at about 164°C and that made the other two peaks -at around 84°C and 230°C-became shoulder peaks for the higher doses i.e. 276-414Gy. Furthermore, in this study we have pointed out the reusability properties of the samples. Muscovite samples in powder form were exposed to 103.5Gy and 207Gy, detected with the wideband blue filter and heated from RT to 400°C with the heating rate 2°C/s for TL readout and same manner repeated 10 times in order to evaluate the reusability of the mineral. Outcomes showed that all 10 cycles have the same 3 peaks at the same temperatures -approx. 81, 166, 215°C- for the 103.5Gy irradiation and again all 10 cycles have the same 3 peaks at the same temperatures -approx. 86, 164, 197°C- for the 207Gy irradiation. Experimental results indicated that crystal structure of the natural Muscovite mineral is not degenerated by heating up to 400°C for at least 10 times and exhibits very gratifying reusability.

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