

The Effect of Grain Size on Optically Stimulated Luminescence Decay Curves of Bulk Synthetic Quartz

A PROJECT REPORT

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Abstract:

In the present research, the effect of the grain sizes of a bulk synthetic quartz sample on optically stimulated luminescence (OSL) decay curves was studied. The lots of the different grain sizes (125-105 μm , 105-90 μm , 90-74 μm , 74-63 μm , 63-53 μm , 53-44 μm , 44-37 μm , 37-25 μm) were exposed by different β -radiation prior optically stimulated luminescence measurements at room temperature and 160°C. The outcomes indicate that the OSL intensity increase up to the grain size 63-53 μm then decreases at room temperature but at 160°C the OSL intensity decrease below 105 μm . The fluctuation in OSL intensity with grain size was due to the combined effect of change in surface area and the increasing temperature. The dose-response curve log-log scale was plotted based on the β -radiation ranging from 2.63 Gy to 131.33 Gy for each grain size. The grain size 63 53 μm and 37-25 μm showed the superlinear behavior to sublinear of OSL signal respectively at 25°C and 160°C measurement.