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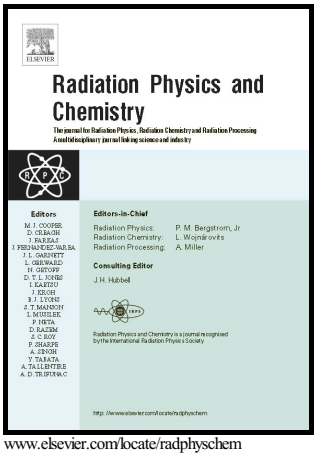

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Determination of Thermoluminescence Kinetic Parameters of White and Blue Chalcedony Exposed to X-ray Irradiation

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ABSTRACT

The study reveals the thermoluminescence (TL) properties of white and blue chalcedony minerals which this mineral mined two different regions (Edirne and Eskişehir, respectively) of Turkey. With the help of various characterization techniques (such as X-ray diffraction (XRD) and Fourier transform infrared spectroscopy (FT-IR)), the gem-quality of the samples was tested. The TL glow curves of the samples irradiated with X-rays show intense main TL glow peak having the maximum temperatures at 100 ^{o}C and 121 ^{o}C with a heating rate of 2 ^{o}C/s, respectively. The TL kinetic parameters of the samples are reported here for the first time. Activation energy (E), frequency factor (s) and the order of kinetics (b) of these peaks have been determined in detail by using various heating rates (VHR) and peak shape (PS) methods and verified by Computerized Glow Curve Deconvolution (CGCD). The CGCD method was used to determine the number of peaks associated with the TL glow curves. The values of E calculated with these three methods are a good agreement.