Dosimetric Characteristics of Jasper

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Some Brazilian stones have already been studied for use as detectors high-dose dosimeters, such as Teixeira el at, 2008. In this work the thermoluminescent method (TL) was utilized for a dosimetric study of different jasper samples, to verify the possibility of their use as high-dose dosimeters or as irradiation indicators in industrial areas. Chalcedony is a group name for the compact varieties of silica composed by minute crystals of quartz with submicroscopic pores. Their color and texture vary considerably according to the impurities present, but in general such materials may be sub-divided into chalcedony (sometimes called jasper) and agate, such as Deer at al, 1974. Jasper color is fairly uniform (green, red, brown, ocean and stripped), and agate color is arranged in bands or in concentric zones. The jasper samples were exposed to different radiation doses, using the gamma-cell 220 system (^{60}Co) of IPEN. The TL emission curves presented two peaks at 130 ºC and 190 ºC. Calibration curves were obtained for the jasper samples between 50 Gy and 100 kGy. The reproducibility of TL response and the lower detection doses were determined. All five types of jasper samples showed their usefulness as irradiation indicators and as high-dose dosimeters.

[1] TEIXEIRA, M. I.; FERRAZ, G. M.; CALDAS, L. V. E. Radiat. Meas., **43**, p.1163-1165, 2008.

[2] DEER, W.A., HOWIE, R.A., ZUSSMAN, J. An introduction to the rock forming minerals, 1974.

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