

## Characterization of Jade-Teflon Composites for Radiation Dosimetry

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Body of Abstract: Jade is the common denomination of two silicates: jadeite and nephrite. They differ in both crystalline structure and chemical composition. In both minerals, the microscopic crystals are tightly interlocked to form a compact aggregate. Jadeite is a silicate of sodium and aluminum, and it is classified as a pyroxene  $\text{NaAl}(\text{Si}_2\text{O}_6)$ . Nephrite is a silicate of calcium and magnesium belonging to the amphibole group of minerals; it is usually called a form of tremolite  $\text{Ca}_2(\text{Mg},\text{Fe})_5(\text{OH})_2(\text{Si}_4\text{O}_{11})_2$ . Samples of jade of New Zealand, Austria, USA and other countries have been studied in this work using the thermoluminescence technique (TL). Composites of jade-teflon were prepared in open atmosphere, and the parts were mixed manually in the ratio 2 (teflon): 1 (powdered sample). This mixture was cooled down with liquid nitrogen to optimize the homogenization. Later it was pressed, and pellets of 25mg were obtained. For the sintering, the samples were thermally treated at 300°C during 1h. The cooling of the samples was performed slowly in the same oven. The samples were irradiated in the interval of 0.01Gy up to 200Gy using sources of  $^{60}\text{Co}$  (panoramic type) and  $^{137}\text{Cs}$ . A Harshaw Chemical Co. TL reader, model 2000 A/B, was utilized for the TL measurements. Preliminary results have demonstrated that TL emission curves are complex with 5 or 6 peaks between 80°C and 280 °C, and they present high sensitivity to gamma radiation of  $^{60}\text{Co}$ , with a main peak at 170°C. In this work results regarding the main dosimetric characteristics of jade-teflon composites will be presented: reproducibility of TL response and energy dependence to gamma radiation. Additionally, linearity tests were performed to evaluate the TL response of the composite pellets studied in this work in relation to the absorbed dose in the therapeutic range.