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AMETHYST SINTERED PELLETS FOR RADIATION DETECTION

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The field of radiation processing is a growing industry that deals with large radiation doses, such as those used for sterilization of medical and pharmaceutical products, water purification, sludge treatment and delayed ripening. To assure that the irradiation procedure is being carried out according to standard specifications, the dosimetry is a fundamental part in quality control programs, and must be accurate, minimizing errors in radiation doses. New techniques and materials are being studied worldwide. The main dosimetric characteristics of Amethyst, Brazilian natural semi-precious stone, were investigated in this work, in order to verify the feasibility of its use for gamma radiation detection using the thermoluminescence (TL) technique. Powdered Amethyst was used to produce sintered pellets with 5.0mm in diameter and 0.8mm in thickness. The samples were tested in X and gamma radiation beams and evaluated in relation to TL glow curves, response as a function of absorbed dose, energy dependence and response reproducibility. The preliminary results show the usefulness of this material in dosimetry for radiation processing.