

Optically stimulated luminescence of different borate glass compositionsJ.V.B. Valença*Universidade Federal de Ciências da Saúde de Porto Alegre*

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Radiation detection applications are pointed out as one of the emerging research areas in glass science. Borate glass presents desirable characteristics for dosimetric applications. The main goal of this work was to analyze the optically stimulated luminescence (OSL) signal for different lithium borate glasses containing magnesia (LMB), quicklime (LCB) or potassium carbonate (LKB). Five different glass formulations were produced for each batch. All formulations were produced by using a melt-quenching method and analyzed in terms of both dose-response and OSL shape decay after submitted to beta irradiation. Pre-heating treatments were also used in the OSL analysis of the samples. The X-ray diffractometry (XRD) and differential thermal analysis (DTA) confirmed the glassy state of the produced samples. In our research, we observed that glass modified with potassium, LKB, is more sensitive to radiation compared with samples produced with magnesium and calcium. Regarding the study done with the LKB formulations, differences in the sensitivity ranking were observed as we either analyzed the OSL signal based on the integrated signal or the emission in the very first 0.16 s. A comparison of this difference was extended to all formulations in the LKB group, which showed that the parameter used to plot the dose-response curve has to be considered in the process of analyzing glassy materials, as it can influence in possible applications. Pre-heating studies also showed tendencies for the studied compositions that were already discussed in the specialized literature for phosphate glass.