The 6th ICCHIBAN: Luminescence efficiency response of Al_2O_3:C, LiF:Mg,Ti and CaF_2 detectors to high-energy HCPs

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Over the past three years, the Al_2O_3:C material started to gain recognition for its use in the space radiation dosimetry field. In this regard, the Oklahoma State University group have been studying the Optically Stimulated Luminescence (OSL) of Al_2O_3:C dosimeters for different high-energy heavy ion exposures using the HIMAC at NIRS (Japan), with the objective of characterizing the luminescence efficiency of the HCP with respect to ^{60}Co sources as well as other basic properties of Al_2O_3:C which may be of interest for use in complex fields, such as the LET dependence of the OSL curve of Al_2O_3:C. In this paper, the detailed results of the 6th ICCHIBAN experiments performed at the HIMAC facility, NIRS (Japan), are going to be presented for different materials and readout luminescence methods, such as: Al_2O_3:C (OSL), Luxel (OSL), LiF:Mg,Ti (TL), and CaF_2:Tm (TL). Updated efficiency curves will be presented with the additional particle/energies (^{12}C 135 MeV/u, ^{40}Ar 500 MeV/u, and ^{84}Kr 400 MeV/u), and absorbed doses will be presented for the blind exposures. These absorbed doses are not corrected for the reduced efficiency of the TLDs and OSLDs to the high LET component of the blind exposures, since this would require extra information on the LET spectrum which is not directly provided by the TLDs or OSLDs. Preliminary analysis using the LET dependence of the TL and OSL curves show that the "mean LET" values are smaller than 2.2keV/μm, thus requiring further investigation on the efficiency of these materials in the low LET region.