

AbstractID: 1190 Title: Dosimetric properties of optically stimulated luminescence in Al_2O_3 for radiation therapy

Although optically stimulated luminescence (OSL) was first suggested as a dosimetry technique in the 1950s, it has only recently been introduced into personnel radiation dosimetry. The detector is a thin film of aluminum oxide doped with carbon encapsulated in a radiation badge. The readout method is similar to thermoluminescent dosimeters (TLDs) except that light instead of heat is used to stimulate luminescence in the material, thereby eliminating the need for nitrogen gas during reading. Two advantages of OSLDs over TLDs are that they can be re-read and also scanned to provide information on the spatial distribution of radiation. Here we investigate their potential use in radiation therapy and compare their dosimetric properties to those of LiF TLDs. We determine their energy response to photons from 80 kVp to 18 MV as well as to electrons at 6, 12 and 20 MeV. Our results show that their energy response to photons closely scales to the mass-energy absorption coefficient of aluminum oxide which, because its atomic number is higher than LiF, exhibits a greater energy variation. Their response to electron irradiations is independent of energy and identical to that of 6 MV photons. Other dosimetric properties studied are dose and dose rate response as well as their response uniformity and fading characteristics. All compare favorably with those of LiF TLDs. Final results will be presented and discussed.