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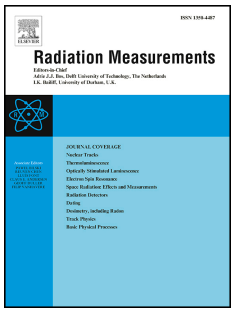

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Abstract

To accurately estimate an actual dose during radiotherapy treatment, dosimeters are required to be inserted into the affected region in a patient's body. Therefore, we are developing a small size dosimeter consisting of optical fibers and optically stimulated luminescence (OSL) elements. We fabricated two types of small size dosimeters using Eu:BaFBr and Ce:CaF_2. We measured the Bragg peak of high energy carbon ions in a water equivalent material. OSL materials showed the quenching effect when irradiated by high linear energy transition (LET) particles. The sensitivity of Eu:BaFBr and Ce:CaF_2 monotonically decreased with different coefficients. The ratio of the signal intensity of these two OSL materials can uniquely determine the sensitivity of each OSL material. We corrected the quenching effect of the OSL dosimeters in the spread out Bragg peak with this relationship.

KEYWORDS: dosimeter, heavy ion radiotherapy, in-vivo dosimetry, optically stimulated luminescence, optical fiber probe, quenching phenomena