

AbstractID:9544Title :Experimental measurement of attenuation factor of a new type of shielding material for HDR Ir-192 source

Purpose: A relatively new type of material, Ledite has been introduced as radiation shielding material for both high dose rate (HDR) brachytherapy and megavoltage external beam treatment rooms. Currently, limited attenuation information is available for this type of material for radionuclides, especially for HDR sources such as Ir-192. Since many of the radiation sources, including Ir-192 HDR source and Linac beams, are not mono-energetic and the material is supplied in the form of block, the shielding calculations based on provided TVL value may potentially lead to errors. This study was undertaken to experimentally measure the attenuation parameters of Ledite blocks for an Ir-192 high dose rate source to ensure adequate shielding design for a HDR treatment room. **Method and Materials:** Ledite blocks are supplied in dimension of 6x6x12 inches. A farm type ionization chamber and HDR Ir-192 source (VariSource, Varian Medical Systems, CA) were used in the measurement. The measurements were conducted for thickness of 6 inches. In the measurement, the distance from the source to the chamber was kept the same for the situations of with and without the blocks placed in between, to avoid the inverse-square effects. The source and chamber were placed at certain distances away from the blocks to account for, to ascertain degree, the contributions from both primary and scatter photons. **Results:** The measurements showed that the attenuation factor of block of thickness of 6 was 0.024. These measured attenuation value was higher than those calculated based on the provided tenth value layer, indicating potential overestimation of radiation attenuation with the provided tenth value layer. **Conclusions:** Attenuation factor was measured for one type of Ledite Block. It was found that the provided TVL may overestimate radiation attenuation for the HDR source. More investigation is warranted.