

SOME CLINICAL APPLICATIONS OF MTS-TYPE TLD DETECTORS

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An important part of any QA programme for radiotherapy is verification, in vitro or in vivo, of calculated doses and dose distributions. We studied the clinical applicability of LiF:MG, Ti sintered TL detectors produced, as type MTS-N, by the Institute of Nuclear Physics in Kraków (INP). These are solid pellets of diam 4.5 mm and 0.8 mm thickness. The TL reader was a modified planchet-type 770A, also produced at the INP, with linear heating and computerised glow curve recording.

For analysis of in vivo applications, we measured, in a water phantom, the dose at 14 points around the Standard gynaecological applicator of our SELECTRON LDR/MDR afterloading unit with Cs-137 pellets and compared the measured values with doses calculated at these points by the in-house developed SELKOM computer code used for

planning gynaecological brachytherapy at the Centre of Oncology in Kraków (COK). Agreement to within 5% was stated.

To demonstrate the applicability of MTS dosimeters in calibration dosimetry, we studied the accuracy, stability and reproducibility of a batch of 100 detectors over several readout cycles at doses ranging from 0.5 to 2.5 Gy. At 1 Gy, the relative standard deviation of Individual Calibration Factors (ICF) over six readout cycles did not exceed 2.5% indicating that the error of dose estimation using individual MTS detectors should not exceed 2%.

In an intercomparison of Co-60 beams at the COK and at Louvain performed with MTS detectors agreement to within less than 0.5% was found with an accuracy better than 1%.

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