Characterisation of TLDs used within the MATROSHKA project – results of ICCHIBAN-6 and NSRL-ICCHIBAN experiments

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MATROSHKA is a facility consisting of an anthropomorphic phantom and designed to measure cosmic radiation organ doses. Currently it is placed outside of the ISS for period of about 1.5 year. Inside this phantom a few thousands of TLDs are distributed. Roughly half of them originate from the Institute of Nuclear Physics (Krakow). We use within this experiment four types of TLDs: MTS-7 (^{7}LiF:Mg,Ti), MTS-6 (^{6}LiF:Mg,Ti), MCP-7 (^{7}LiF:Mg,Cu,P) and MTT-7 (^{7}LiF:Mg,Ti with changed activators concentration and increased high-LET response). It is proposed to exploit ratios of responses of these three TLDs for extracting some information about ionization density of the unknown high-LET radiation field. In this way it is possible to correct the under-response of TLDs for such radiation.

While MATROSHKA is exposed at the Earth orbit, an extensive research program on characterization of TLDs response in various radiation field is realized. The most important part of this study is series of ICCHIBAN intercomparisons, which offer opportunity of exposures with high-energy ion beams. Within the presentation, results of two experiments will be shown: ICCHIBAN-6 and NSRL-ICCHIBAN.