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ENSURING THE RADIATION SAFETY OF MEDICAL EXAMINATIONS WITH THE USE OF THERMOLUMINESCENT DOSIMETRY

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Radiation diagnostics and therapy are the most effective, large-scale and dynamically developing branches of healthcare. More than 80% of all diagnoses are established with their help [1-3]. Reducing the doses of medical exposure of personnel and patients by only 10% in its effect is tantamount to the complete elimination of other artificial sources of radiation exposure to the population, including nuclear energy.

The main physical quantity that determines the degree of radiation exposure to the environment and humans is the absorbed dose of ionizing radiation. The concept of "absorbed dose" applies to any type of radiation, any irradiated material and the detector used for registration. However, it should be understood that the absorbed doses of different types of radiation in different materials at the same exposure doses can vary significantly, therefore, to measure them in a certain environment, it is necessary to use materials as detectors that are closest in their physicochemical characteristics to the parameters of the environment. [4-6]. An important condition for adequate dosimetry of different tissues is the thickness of the detector used and the cover layer.

Dosimetric control can allow the selection of optimal radiation regimens, reduce doses for medical staff working under x-ray control and patients due to improved technology of procedures. It is important to involve physicians – radiologists and radiologists in this activity. Currently, regulatory documents [3] offer them the use of various indirect methods of control.

The paper proposes the use of thermoluminescent detectors TLD-K (effective atomic number - Zeff is similar to bone tissue) to measure absorbed doses in the range from 0.1 mGy to 1 kGy [5,6]. A technique for dosimetric control of medical staff working under X-ray control and patients during diagnostic studies and X-ray therapy is proposed. The use of these highly sensitive detectors and micron-thick cover layers makes it possible to record doses, including those to the skin and cornea of the eyes, and to study their distribution [7].

Hydrophilic biocompatible and low toxicity microparticles of TLD-K detectors based on silicon oxide allow the detection of biochemical processes in vivo. At extreme doses, such as radiation treatment, every micron-sized detector particle can be detected [8].

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