

Advances in EPR dosimetry in terms of retrospective determination of absorbed dose in radiation accidents

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The electron paramagnetic resonance measurements of dosimetric signals originating from radicals generated under the influence of ionizing radiation allow to determine the dose absorbed by the casualties of radiation accidents. The study material can consist of victim's teeth, bones or nails. Also human hair and mineral glass from personal electronic devices, that people had in the moment of accident, are considered to be useful in dosimetry. Although X-band (9.4 GHz) spectrometers predominate, Q-band devices (34 GHz) enable to increase the sensitivity of measurements and reduce the size of specimens, whereas L-band machines (1.1 GHz) are suitable for in vivo dosimetry. The EPR tooth enamel dosimetry has been used many times to assess the cumulative radiation dose and health risk in people living in areas contaminated due to the radiation accidents and to determine the unknown absorbed doses in patients after the overexposures during radiotherapy treatment.