THE POTENTIAL OF PROTECTIVE GLASS FROM SMARTPHONES AS AN EMERGENCY PERSONAL DOSIMETER FOR MEMBERS OF THE GENERAL PUBLIC IN RADIOLOGICAL ACCIDENTS

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Assessment of personal doses due to acute exposure of individuals during large-scale radiological events, such as nuclear power plant accidents or terrorist incidents involving radioactive materials, requires the adoption of multiple dosimetry methods including biodosimetry and physical dosimetry techniques. Among the physical dosimetry methods proposed, optically stimulated luminescence (OSL) is currently one of main techniques suggested to reconstruct acute doses using different components of mobile phones. In laboratory simulations, the technique has been successfully tested with components such as surface mount resistors, integrated circuits, and other electronic components of mobile phones. Disadvantages of using these components include the need to destroy the electronic device. As a result, protective glasses have also been tested as potential emergency dosimeters using OSL. These glasses have been shown to exhibit several favorable dosimetric properties including a strong sensitivity to radiation, a linear dose-response relationship, good reproducibility, and a minimum measurable dose in the low tens of milligray, even after significant fading. Fading of OSL signal can be high; however, a fading curve can be developed to correct for signal loss. Dose-recovery tests have demonstrated that reconstructed doses are capable of accuracies within a few percent. A recent innovation includes development of an OSL reader which allows OSL measurement on the whole phone, without the need for removal of the protective glass from the phone, and calibration of the glass while the phone remains fully operational.