Title: Tempered glass as a thermoluminescent medium for retrospective dosimetry.

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Abstract: Globally, the use of nuclear facilities and the potential risks associated with the dispersal of ionizing radiation due to natural disasters or technical failures are on the rise. These risks can have severe consequences for the environment and all living organisms, particularly humans. There is currently no practical method available to accurately estimate the radiation doses received by the surrounding areas and individuals in such situations. To address this issue, retrospective dosimetry can be employed to estimate the actual radiation dose, followed by the implementation of remediation techniques. Considering this need, tempered glass, which is commonly used as a screen protector for smartphones by the general public, has been identified as a promising medium for retrospective dosimetry. The present study aimed to investigate the thermoluminescence (TL) properties of six different types of tempered glass subjected to ^{60}Co gamma rays, specifically examining the TL dose response, linearity, repeatability, and fading. Among the various glass samples tested, HD anti-peep tempered glass demonstrates a highly linear dose-response and the greatest dose sensitivity within the examined dose range of 2–50 Gy. Additionally, the HD anti-peep tempered glass exhibits minimal loss of TL yield (~23%) at 28 days post-irradiation, making it particularly suitable for use as a retrospective dosimeter.

Keyword: Smartphone Screen Protector Glass, Thermoluminescence Characteristics, Gamma Irradiation, Retrospective Dosimeter.

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