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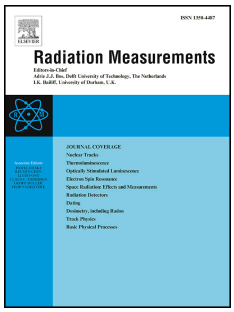

Exploring the behaviour of luminescence signals from feldspars: Implications for the single aliquot regenerative dose protocol

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Exploring the behaviour of luminescence signals from feldspars: implications for the single aliquot regenerative dose protocol

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Abstract

A series of dose recovery experiments are undertaken on grains of potassium-rich feldspar using a single aliquot regenerative dose (SAR) protocol, measuring the post-infrared infrared stimulated luminescence signal (post-IR IRSL). The ability to successfully recover a laboratory dose depends upon the size of the test dose used. It is shown that using current SAR protocols, the magnitude of the luminescence response (T_x) to the test dose is dependent upon the size of the luminescence signal (L_x) from the prior regeneration dose because the post-IR IRSL signal is not reduced to a low level at the end of measuring L_x. Charge originating from the regeneration dose is carried over into measurement of T_x. When the test dose is small (i.e. 1% to 15% of the given dose) this carry-over of charge dominates the signal arising from the test dose. In such situations, T_x is not an accurate measure of sensitivity change. Unfortunately, because the carry-over of charge is so tightly coupled to the size of the signal arising from the regeneration dose, standard tests such as recycling will not identify this failure of the sensitivity correction. The carry-over of charge is due to the difficulty of removing the post-IR IRSL signal from feldspars during measurement, and is in stark contrast with the fast component of the optically stimulated luminescence (OSL) signal from quartz for which the SAR protocol was originally designed.

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