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A new thermoluminescence mixed order model considering thermal quenching effect

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Abstract

Thermal quenching as an important and well-known effect in compounds exhibiting thermoluminescence, should be considered in thermoluminescence studies. Among the models describing the thermoluminescence phenomenon, the mixed order kinetic model provides a more realistic description of this behavior. In this work, the thermal quenching effect is included in the mixed order kinetic model and the new thermoluminescence glow curve deconvolution function is obtained in terms of the maximum intensity and the maximum intensity temperature. The new equation reduces to the known mixed order model by equating the thermal quenching parameter to zero. Also the kinetic parameters of the peak 5 of LiF: Mg, Ti (TLD-100) thermoluminescence dosimeter considering the new equation (with thermal quenching effect) and the previous equation (without thermal quenching effect) for different heating rates are determined and the results are compared.

Keywords: thermoluminescence, thermal quenching, mixed order model, kinetic parameters, TLD-100

For full article, refer to the Persian section