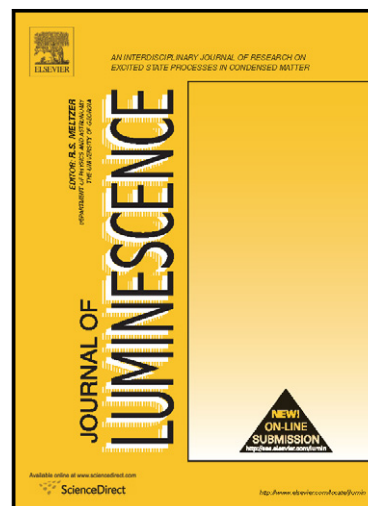


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Y. Wang, P.D. Townsend



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Potential problems in collection and data processing of luminescence signals

Y. Wang¹ and P. D. Townsend²

¹ School of Science, China University of Geosciences, Beijing, China 100083

² University of Sussex, Brighton, BN1 9QH, UK

Abstract: Luminescence studies are central to a very wide range of disciplines, both as a primary experiment and in a minor role for additional discrimination between samples. Unfortunately when luminescence studies are not the central objective and expertise the data collection, instrumental corrections and data analysis are not always being totally, or correctly, employed. There are often historical reasons for this but with modern equipment one can readily make the requisite compensations. The problems are outlined with emphasis on spectral and polarization response of spectrometers and detectors. Typical data processing errors are noted with demonstrations of their consequent effects on the signals. These include the fact that the peak in the wavelength presentation can significantly differ from the true energy centre of a Gaussian emission band. There can be failure to totally compensate for the spectral sensitivity of the detection system; as well as the incorrect use of band de-convolution on the wavelength representation, and energy plots where only the wavelength axis has been corrected, these mistakes all distort the true spectra. Not only are these analyses physically incorrect, but they are misleading, and introduce false features. This brief review indicates why such processing errors can generate spectral differences cited in the luminescence literature that are from measurement, rather than differences between source materials.

Keywords: luminescence; correction factors; band de-convolution;

Corresponding author: wyfemail@gmail.com

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