
Contribution ID: **78** Type: **not specified**

# On the combined analysis of luminescence for thermal assistance and thermal quenching

*Thursday, 11 July 2019 10:40 (20 minutes)*

If the emission of luminescence is affected by thermal assistance, and if the total probability of emission 1/τ is modulated by a Boltzmann factor exp(- E<sub>α</sub>/ κT) where E<sub>α</sub> is the activation energy of thermal assistance, the overall probability of optically stimulated luminescence emission can be expressed for <i>n</i> electron traps as:

1/τ = [1/τ<sub>rαd</sub> + ν exp( - ΔE / κT) ] Π <sup>n</sup><sub>i</sub> exp ( - E<sub>αi</sub> /κT)

where T<sub>rαd</sub> is the radiative lifetime, and are as previously defined, υ is the activation energy for thermal assistance for the electron trap and the number of electron traps contributing to the process [1]. We will examine how to quantify thermal effects in cases where the luminescence ensues with very high efficiency such that any little additional component due to thermal assistance and any loss due to non-radiative transitions is masked.
References
1 Chithambo, M.L., Costin, G., 2017. Temperature-dependence of time-resolved optically stimulated luminescence and composition heterogeneity of synthetic ⊠-Al2O3:C. J. Lumin. 182, 252-262.

## Apply to be<br> considered for a student <br>   award (Yes / No)?

No

## Level for award<br> (Hons, MSc, <br>   PhD, N/A)?

N/A

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**Session Classification:** Physics of Condensed Matter and Materials

**Track Classification:** Track A - Physics of Condensed Matter and Materials