



UNIVERSITEIT VAN PRETORIA
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An experimental and modeling study of the thermoluminescence of natural quartz

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**Abstract content
 (Max 300 words)**

The objective of this presentation is to discuss the mechanisms of thermoluminescence in natural quartz using experimental and modeling techniques. Thermoluminescence is the thermally stimulated emission of light from insulators or semiconductors which have been previously irradiated. During stimulation, the irradiated sample is heated at a controlled rate in order to release electrons from certain defect centres. The loss of energy as such electrons relax from their metastable states appears as luminescence and is referred to in this case as thermoluminescence. Experimental glow curves showing the thermoluminescence intensity as a function of temperature are obtained from such measurements. Various methods of analysis are used to extract kinetic parameters from the glow curves. Kinetic parameters are associated with charge transfer processes within the material under study. Through thermoluminescence, knowledge associated with defects within a material is gained since a given thermoluminescence peak is characteristic of a particular defect. Quartz, the subject of our investigation is one of the most abundant minerals in nature. Due to its crystalline structure, it is suitable for use as a luminescence dosimeter. We intend to present results of the kinetic analysis of thermoluminescence from natural quartz. Different methods of analysis including partial, whole curve, peak shape methods and glow curve deconvolution will be used. Isothermal analysis of selected glow peaks and phototransfer effects will also be investigated. In addition, glow curves analysis will be complemented by using computational modeling based on rate equations describing thermoluminescence.

**Apply to be
 consider for a student
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yes

**Level for award
 (Hons, MSc,
 PhD)?**

MSc

**Main supervisor (name and email)
and his / her institution**

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**Would you like to
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yes

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