3D Raman mapping of melt inclusions in Kerimasi (Tanzania) alkaline and carbonatite rocks

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The use of confocal HR-Raman mapping opens new perspectives in studying melt inclusions. Our major goal is to show advantages of this powerful technique through case studies carried out on alkaline and carbonatite rocks of Kerimasi volcano (East African Rift). Raman spectrometry is one of the few methods that enable qualitative non-destructive analysis of both solid and fluid phases, therefore it is widely used for the identification of minerals and volatiles within melt and fluid inclusions. For better understanding of petrogenetic processes in carbonatite systems it is essential to find all mineral phases in the melt inclusions trapped in intrusive or volcanic rocks. Previous Raman spectroscopic point measurements in melt inclusions revealed the presence of daughter phases (e.g. alkali carbonates, hydrocarbonates) [1] but utilizing Raman mapping on them even provides information on their size, shape and distribution. Raman 3D mapping were applied on unheated multiphase melt inclusions of intrusive and volcanic rocks with high spatial resolution (XY plane < 1 micron) with a depth scan (Z step) as low as 0.5 micron at every XY point, parallel to the surface of the host minerals. Analysis below the surface of the host mineral is especially useful because we can avoid the loss of sensitive (e.g. water soluble) phases and contamination of the melt inclusions, moreover unexposed melt inclusions are suitable for further analytical measurements (e.g. EPMA, microthermometry). By scanning multiple layers 2D or 3D Raman images can be gained, thus we can get an insight into post entrapment crystallization processes that contribute to a more precise description of the evolution of alkaline and carbonatite rocks.

References

[1] Káldos *et al.* (2015*) Lithos*, **238**, 101–119.

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