

## **Microprobe Trace Element Study on Melt Inclusions from Hawaiian Basalts by SR-XRF**

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Hawaiian basalts are characterized by anomalously high Sr and low Th-U concentrations, features which are also found in gabbros from ophiolites and the oceanic crust. In order to check whether these anomalies are also present in the primary magmas, Sobolev et al. (1998) have analyzed melt inclusions in olivine phenocrysts from picritic basalts from the Mauna Loa volcano (Hawaii). They found large Sr and low Th concentrations.

We have analyzed 10 – 100 µm large inclusions in Mauna Loa and Mauna Kea samples by synchrotron radiation induced X-ray fluorescence (SR-XRF) at Hasylab, Hamburg. The concentrations of about 15 trace elements (e.g., Rb, Sr, Y, Zr, Nb, Ba, light REE) could be determined with analytical uncertainties between 10 and 30%. We have also determined the chemical composition of the bulk samples by SSMS and XRF.

Bulk samples for the various samples differ in their absolute Sr concentrations, but are similar in their Sr/Zr ratios (about 2). The melt inclusions show a very different behavior; Sr/Zr ratios vary extremely from 0.3 to 6, especially for the Mauna Loa samples. Because the ratios of Zr to other incompatible trace elements (e.g., Zr/Nb =  $11 \pm 2$ ) are nearly uniform, the Sr/Zr variability is due to Sr heterogeneities in the melt inclusions.

The extremely variable Sr abundances in the inclusions may confirm the hypothesis of an unusual and heterogeneous Hawaiian source and supports the model, in which significant amounts of recycled, formerly gabbroic oceanic crust is heterogeneously distributed in the Hawaiian plume.