# Design Overview of the Potsdam 1280-HR SIMS Instrument

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The Helmholtz Zentrum Potsdam is currently installing a CAMECA 1280-HR SIMS, which will begin producing user data in the autumn of 2013. This state-of-the-art, ultra-high sensitivity and large geometry ion microprobe will function as an open user facility, in accordance with the Helmholtz Society's support of the global scientific community through providing access to top-end infrastructure. The new 1280-HR instrument will be integrated into the Helmholtz SIMS network, whereby the activities in the Potsdam laboratory will be closely coordinated with new SIMS infrastructure currently being installed in both Dresden (accelerator SIMS) and Leipzig (NanoSIMS 50L). While the 1280-HR is intended mainly for geoscience studies, the facility will also support a limited number of well defined material science investigations as well as serving as a platform for instrumentation development work. This abstract provides a brief overview of the new facility's design and operational goals.

The instrument currently being installed consists of the basic 1280-HR design, including the five trolley multi-collection system along with a Resistive Anode Encoder, thus making the system optimized for both low uncertainty isotope ratio determinations (e.g., $\delta^{13}C$, $\delta^{18}O$ and $\delta^{34}S$) as well as quantification and distribution mapping of low concentration elements in minerals, glasses or biological materials. The possibility of very high mass resolution of $M/dM \geq 25{,}000$ allows the separation of isobaric masses, such as $^{40}Ca$ and $^{40}K$. The sample loading system consists of the standard 2-positon carousel; a high capacity 500 l/s turbo pump with vibration damping provides improved vacuum in the sample source chamber. The most significant design modification unique to the Potsdam instrument is the addition of 5 flanges in the coupling and projection sections of the machine, including one intended for the integration of a total ion current measuring capability. Factory testing has shown a repeatability for $\delta^{18}O$ determination (n= 10) of ± 0.25 ‰ (1sd) on a quartz disk, with further improvements in analytical uncertainty expected once the instrument enters routine service. Envisioned key analytical topics include H, B, C, O, S and Pb isotopic studies, geochronological applications and the quantification of volatile elements in geological materials.

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# Trace-elements distribution in tourmaline, micas and K-feldspar from the Berry-Havey pegmatite (Maine, USA): implications for the pegmatitic evolution

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The Berry-Havey pegmatite (Oxford pegmatite field, Androscoggin County, Maine, USA), is a highly evolved pegmatite enriched in Li, F, B, Be and P. The pegmatite has a complex internal structure, with four texturally and compositionally different zones, which show an increasing degree of evolution inwards: wall zone, intermediate zone, core margin and core zone, where gemmy tourmaline-bearing pockets are common. The main minerals are quartz, feldspars, Al-micas (muscovite-lepidolite series), tourmaline (schorl-elbaite-rossmanite), and minor Fe-micas (biotite and zinnwaldite). Garnet, beryl, amblygonite-montebrasite, and apatite are common accessory minerals.

Most trace elements do not show a clear preference for any of the main minerals. However, Li, Cs, Mn, Ba, Nb, and Ta mainly partition into the Fe-mica, whereas Be, Sn, W and Zr partitions preferably into the Al-mica. P and Sr partition into the K-feldspar. Tourmaline is the poorest of the four phases in trace elements. Li content increases from the wall zone to the core in all the phases. Rb, Cs and Ba show a similar trend for micas and K-feldspar, with Rb and Cs increasing gradually from the wall zone to the core zone, simultaneously to the decrease of Ba. In tourmaline Li, Be, Mn, Sn, Nb and Ta contents increase from the wall zone to the core zone, and finally decrease in the gemmy tourmaline from the pockets. Overall, REE contents are very low. The origin of these differences relates to the concentration of the elements in the melt and the variations in the compatibility of these elements between the minerals and melt during fractional crystallization, which in turn depends on the behavior of major elements. Micas, K-feldspar and tourmaline are good geochemical monitors using trace elements such as Li, Rb, Be, Sr and Ba, to understand the petrogenesis of pegmatites.

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