

Loki's Castle Arctic Vents and Host Sediments: Mineralogy and Geochemistry

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Loki's Castle hydrothermal field is located in the Arctic Ocean, in the bend between the South Knipovich Ridge and the Mohns Ridge, at $\approx 74^{\circ}\text{N}$. The results presented here are from samples collected with the ROV Bathysaurus XL and consist of chimney fragments and seafloor sediments from the vicinities.

The studies consist of a petrographic description, X-ray diffraction analysis, chemical analyses under the electron microprobe and bulk chemical analyses of major and trace elements.

The sulphide assemblage most commonly present in the samples consists of sphalerite, pyrite and pyrrhotite, with minor amounts of chalcopyrite. Sulphide-poor selected samples collected at the base of chimneys are mostly composed of anhydrite, gypsum and talc. Association of quartz, anhydrite, gypsum and barite were also found in some of the sediment samples. The observed sulphide assemblage is consistent with the temperature of 320°C measured in Loki's Castle vents. The interior of chimneys are enriched in Zn, Cu and Fe while the exterior are enriched in Ba and Sr.

REE patterns for the recovered seafloor sediments show a perfect match with NASC.

The sulphide-poor samples collected at the base of the chimneys denotes sea water interaction with the hydrothermal fluid and consequent decrease in the temperature, precipitating sulphates.