

## Intra-transform magmatism; Melt migration and two-component mantle

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Oceanic intra-transform magmatism is not supported by long-lived magma chambers or along-axis transport of melt from other parts of the spreading system, thus providing well-defined locations of melt delivery and crustal formation. Intra-transform basalts therefore represent pre-aggregated melts and their compositions provide insight into models of melt generation and transport processes beneath mid-ocean ridges. The Quebrada/Discovery/Gofar (QDG) transform fault system offsets the fast-slipping East Pacific Rise (3°-5°S) by approximately 400km and is composed of 8 active intra-transform spreading centers ranging in length from 5 to 70 km. Forty-seven dredges of young intra-transform basalts were collected and geochemically characterized from this area.

QDG basalts exhibit varying degrees of differentiation, which correlate with the estimates of crustal thickness of each ridge segment derived from gravity models. The incompatible trace element ratios (e.g. Th/La) of these lavas range significantly from depleted to enriched compositions at similar MgO content, and the level of enrichment correlates well with indicators of depth of melt segregation (e.g. Sm/Yb). Overall, the chemical variation of these basalts is greater than that previously found in fracture zones (such as Siqueiros and Garrett FZ) and is similar to the compositional range defined by northern EPR seamounts.

A simple geochemical model reproducing the trace and isotopic data of QDG basalts suggest that melting of a two-mantle component and the effect of melt migration can easily explain the compositional range observed at mid-ocean ridges.

## Arsenic in siliceous deposits formed from geothermal water

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### Arsenic in geothermal power plants

Geothermal water, which discharges from deep underground, contains various harmful elements since it is volcanic origin. Especially, arsenic (As) concentration of geothermal water is outstanding and is generally several ppm. Therefore, the geothermal water after water/vapor separation for electric generation has been returned into deep underground again through re-injection wells at geothermal power plants. On the other hand, siliceous deposits, which are formed from geothermal waters, have been discharged into environment as industrial wastes. However, they are possible to take up As from geothermal water during the formation. Whereas, the uptake mechanism of As by siliceous deposits formed from geothermal water and its chemical state have never been investigated. In this study, the uptake mechanism of As by siliceous deposits in geothermal water at a geothermal power plant and change in the chemical state of As during the formation of siliceous deposits was investigated.

### Results and Discussion

From the correlation analysis between elements in siliceous deposits formed from geothermal water at the Hatchobaru geothermal power plant, Japan and rare earth element pattern of the geothermal water, As can be concluded to be taken up by coprecipitation with hydrous iron (III) oxide. Although the siliceous deposits were formed from oxidizing geothermal water, the inside of the deposits was considered to be in reducing environment because of the conversion of hydrous iron (III) oxide to pyrite. No As was contained in the pyrite. Due to the conversion, the As may immigrate from Fe phase to silicate phase based on the result of chemical leaching treatment.