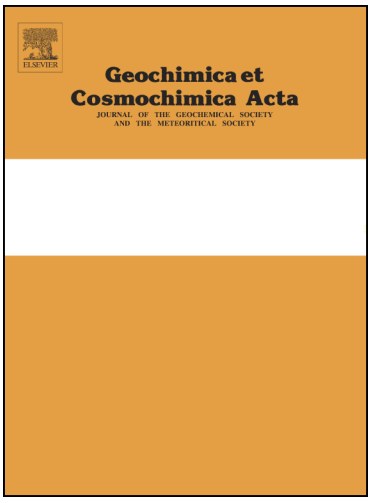

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Stable and radiogenic strontium isotope fractionation during hydrothermal seawater-basalt interaction

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Abstract

The fluid-rock interactions occurring in hydrothermal systems at or near mid-oceanic ridges (MOR) were studied experimentally by reacting crystalline and glassy basalt with seawater at 250 and 290 °C while monitoring the liquid phase Sr isotopic evolution ($^{87}Sr/^{86}Sr$ and $\delta^{88/86}Sr$). The results indicate that seawater Sr was incorporated into anhydrite during the early stages of seawater-basalt interaction. Liquid $^{87}Sr/^{86}Sr$ values trend towards the basaltic signature as non-stoichiometric basalt dissolution became the dominant process. This suggests that the interplay between fast Sr incorporation into secondary sulfates versus slow and continuous Sr liberation due to basalt dissolution at intermediate temperatures could partly explain previously identified discrepancies between MOR heat budget constraints and the