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Copper Isotope Studies of Submarine Hydrothermal Systems

Rachael Helen James (r.h.james@open.ac.uk)

Dept. of Earth Sciences, The Open University, Milton Keynes, UK

Techniques have been developed for the high precision measurement of $^{65}Cu/^{63}Cu$ ratios by multiple-collector plasma-source mass spectrometry. Sample-standard bracketing methods give an analytical uncertainty in $^{65}Cu/^{63}Cu$ of 0.7 parts per 10^4 (0.7 ε units) which is >30 times the natural variation reported to date (Zhu et al., 2000). We will use these techniques to measure the copper isotope ratio of submarine hydrothermal vent fluids, and plume particles from the Broken Spur site, Mid-Atlantic Ridge. Vent fluid compositions give information as to fractionation processes occurring during basalt-seawater reactions at high temperature and pressure. Mixing of vent fluids with seawater in the rising hydrothermal plume results in uptake of seawater Cu by plume particles, either through co-precipitation or scavenging (James & Elderfield, 1996). Thus measurement of Cu isotope ratios in plume particles will allow us to estimate the Cu isotope ratio of seawater below the thermocline in the region of Broken Spur. Taken together, these data allow us to assess (for the first time) how chemical reactions occurring within hydrothermal systems regulate the Cu isotope ratio of seawater.

Zhu XK, O'Nions RK, Guo Y, Belshaw NS & Rickard D, *Chem. Geol.*, **163**, 139-149, (2000).

James RH & Elderfield H, *Geophys. Res. Lett.*, **23**, 3499-3502, (1996).