

Bromine distribution and speciation within the aragonite shell of the marine mollusc *Arctica islandica*

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Bromine is a major component of seawater. Variable concentrations of this element within biomineral carbonates (e.g. corals, foraminifera and mollusc shells) could potentially be used as a seawater salinity proxy.

Seawater bromine occurs as inorganic bromide (Br^-), with other forms of this element being inorganic bromate (BrO_3^-) and organobromine compounds, the latter having been identified in marine sediments [1, 2].

Synchrotron radiation micro-XRF and X-ray Absorption Near Edge Structure (XANES) techniques have been used to map the distribution and speciation of bromine within thin sections of the aragonite shell of the long-lived marine mollusc *Arctica islandica*. Data were collected on GSECARS (GeoSoilEnviroCARS) X-Ray Microprobe beamline 13-ID-E at the Advanced Photon Source (APS), Argonne National Laboratory, Illinois, USA. Reference XANES spectra were generated for bromide and bromate compounds so that the shift in bromine K-edge energy can be used to identify the speciation of bromine within the natural carbonate samples.

Micro-XRF elemental mapping identifies a heterogeneous bromine distribution within the aragonite *Arctica islandica* shell, with implications for future sampling strategies if bromine concentrations can be used for palaeosalinity reconstruction. Bromine K-edge XANES spectra are used to identify bromine speciation in the aragonite shell and also in the organic periostracum that covers the shell surface.

[1] Leri et al. (2010) *Global Biogeochemical Cycles* **24**, GB4017. [2] Leri et al. (2014) *Geochimica et Cosmochimica Acta* **142**, 53–63.