

## **Combined stable strontium and sulfur mass dependent isotopic measurements in barite to identify origin**

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Barite ( $\text{BaSO}_4$ ) is a highly stable and widely-distributed mineral found in magmatic, metamorphic, and sedimentary rocks (of all ages), as well as in soils, aerosol dust, and extraterrestrial material. Today, barite can form in a variety of settings in the oceans (hydrothermal, cold seeps, water column, sediments) and on the continents – where supersaturation and precipitation of barite can occur from the mixing of fluids – one containing Ba and another containing sulfate. Microbial oxidation of sulfur is thought to play a key role in precipitation of barite within some continental settings –imparting a large mass dependent sulfur isotopic signature - whereas in the marine setting bacteria could play a significant role but shows no influence on the  $\delta^{34}\text{S}$  of marine barite. Sulfate  $\delta^{34}\text{S}$ ,  $^{87}\text{Sr}/^{86}\text{Sr}$  and stable Sr-isotopic signatures ( $\delta^{88}\text{Sr}$ ) of modern authigenic continental barite will be compared to modern pelagic marine barite and marine hydrothermal and cold seep barite to investigate the potential for their combined use to indicate origin of barite samples. This includes investigation of the systematics of a fairly new stable isotope system – the stable Sr-isotope system in earth sciences. To understand the controlling parameters of stable Sr-isotopic fractionation in continental and marine barite results from Holocene pelagic marine barite, hydrothermal and cold seep barite, and modern authigenic continental barite from three warm artesian springs in the continental United States will be presented and compared to theoretical estimates for stable Sr-isotopic fractionation and nonbiogenic experimental data. The combined use of mass-dependent S and stable Sr-isotopic measurements of barite will be evaluated as a new geochemical proxy to identify mode of barite mineralization for use in earth science applications including understanding ancient barite deposits.