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## Sulfur cycling in carbonatite of the Kaiserstuhl volcanic complex (Germany)

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The redox sensitive element sulfur is used for reconstructing the oxygen fugacity during magmatic melt evolution applying the sulfur isotopic composition of sulfide and sulfate minerals. Especially fast ascending sulfur-rich alkaline magma from the upper mantle provides the possibility for determining the oxidation state of Earth`s mantle via a detailed investigation of the sulfur cycling. Here we present the first sulfur isotope data of sulfides, sulfates as well as carbonate associated sulfate (CAS) of carbonatite (sövite) from two well-studied locations (Orberg and Badberg) of the Kaiserstuhl volcanic complex, situated in the southern part of the Upper Rhine Graben (Germany). Based on our results, sövites are 25000 times more enriched in sulfate than in sulfide. Sulfides display a  $\delta^{34}\text{S}$  value of 0.6 ‰ (V-CDT), whereas water-soluble sulfate (e.g. anhydrite) show a sulfur isotopic composition between 3.8 ‰ and 6.1 ‰.  $\delta^{34}\text{S}_{\text{CAS}}$  data are at 6 ‰ at the Orberg and 9 ‰ at Badberg locality. Our sulfur isotope data are comparable to other carbonatite occurrences worldwide (e.g. Phalabora, South Africa), emplaced at similar temperatures (ca. 860 °C). However, the strongly elevated sulfate content recorded here for sövites formed at this high temperature is unique and indicates an enhanced oxidation state during sövite formation in the Kaiserstuhl volcanic complex.