

## Li isotopes and geochemistry of Li-F-Sn greisen from the Zinnwald deposit, Germany

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The Sn–W greisen deposits, located in the eastern part of the Variscan metallogenic Erzgebirge province (zinnwaldite Ar–Ar ages between 313 and 315 Ma [1]), are emplaced in highly metamorphosed and/or igneous rocks and typically are associated with post-collisional Li–F-enriched small granitic intrusions [2]. This metallogenic province traditionally belonged to the major source of economic Sn, Ag, U, W, Co, and fluorite–barite deposits for central Europe [3]. The Zinnwald/Cínovec Li–Sn greisen deposit is associated with a unique zinnwaldite–quartz–topaz mineralization hosted by an albitized stock-granite.

Li contents and isotope compositions were measured in host albite granites (n=2), greisens (n=3), and a sample from a flat-dipping vein in the Zinnwald deposit, paralleled by individual mineral phases. All investigated bulk rocks have extreme Li contents reaching from 1,600–2,200 ppm in albite-granite, to 3,400–6,200 ppm in greisen-type rocks and to ~8,000 ppm in a vein-type sample, most likely carried by zinnwaldite (15,000–19,200 ppm) and muscovite (9,500–15,700 ppm) whereas albite and quartz, in particular, have significantly lower Li abundances (560–660 and 33–330 ppm, respectively). The high bulk Li contents are very unusual even for chemically evolved granitic systems with the exception of Li-rich pegmatites. Bulk  $\delta^7\text{Li}$  values are restricted (–1.0 to 0.3 ‰), consistent with late orogenic granites from a larger area of the Erzgebirge Mts. [4]. Zinnwaldite and muscovite carry isotopically heavy Li relative to the corresponding bulk rocks and, at the same time, muscovite always is slightly heavier than zinnwaldite.  $\delta^7\text{Li}$  values of quartz become progressively heavier from granites through greisens to a vein sample. Zinnwaldite may represent a late-stage ingress of Li-rich fluids/melts rather than indigenous phase of these lithologies because from mass balance considerations and mineral modes, bulk [Li] and  $\delta^7\text{Li}$  values cannot easily be reconstructed for either sample of the suite.

[1] Seifert *et al* (2011) *Min Mag* **75**, 1833. [2] Seifert & Kempe (1994) *Eur J Min* **6**, 125-172. [3] Baumann *et al* (2000) *Ore deposits of the Erzgebirge*, Enke. [4] Romer *et al* (2014) *GCA*, in press.