In-situ measurements of Li isotopes in quartz: implications for magmatic-hydrothermal evolution of Koktokay No.3 rare metal pegmatite

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In-situ lithium isotopes composition in quartz (9 samples) from seven textural zones of Koktokay No.3 pegmatite, Altai, China[1], were measured by SIMS (Cameca 1280HR, IGGCAS) [2] to examine their potential in tracing magmatic-hydrothermal evolution of metallogeny of granitic pegmatites. Our preliminary results demonstrate that quartz originated from different stages of magmatic-hydrothermal system shows great differences in its Li-isotope composition.

The Li-isotope value of different textural zones have extremely large range and distinct characters (Figure 1). The Li content increased gradully from rim to zone III while δ^7Li droped dramaticly. There is abrupt transition between outer zones (rim-zones I-III, melt stage) and inner zone VIII (fuild stage), which concordant with previous documented magmatic-hydrothermal evolution stage. The large variation in Li abundance of zones IV-VI (melt-fluid stage) are considered to related to fluid exsolution.

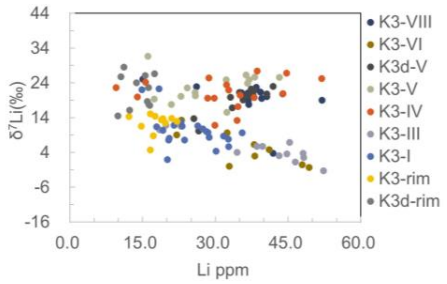

Figure 1 SIMS in-situ Li data of quartz from different zones

The results also suggest, though there must be diffusion driven isotopic fractionation [3], Li-isotope composition of large quartz might still carry useful petrogenetic and metallogenic information, which can provide new evidence for the study of magmatic-hydrothermal evolution in pegmtite.

[1] Zhou et al. (2015), *Eur.J.Mineral.* 27, 433-457. [2] Li et al. (2011), *J. Anal. At. Spectrom* 26, 352-358. [3]Gao et al. (2015), *Sci. Rep.* 5, 16878.