Goldschmidt 2022 Abstract
https://doi.org/10.46427/gold2022.12873

Differences in geochemical behavior of Be, Nb, Ta, Rb and Cs in NaCl-H_2O-CO_2 fluids: Implications for rare metal mineralization processes

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Most rare-metal-bearing pegmatites in the world, especially LCT-type pegmatites, produce inclusions containing CO_2 [1-4] and Li_2CO_3, calcite and (Mn, Fe)CO_3 sub-minerals are found in fluid inclusions[5-6] . Therefore, CO_2 is common in LCT-type pegmatite magmas, but compared with other volatiles, the effects of CO_2 on rare metal mineralization processes was less studied. To provide insight into the formation of rare metal-bearing pegmatite deposit, high pressure experiments were performed to quantify the role of CO_2 on the dissolution and distribution behavior of pegmatite-type rare metals (Be, Nb, Ta, Rb and Cs). Metal oxides was placed together with a single-phase NaCl-H_2O-CO_2 fluid (8 wt% NaCl Eq.) at 600â—¦C and 300MPa. At such conditions, combined microthermometric and LA-ICP-MS analysis of synthetic fluid inclusions reveals that CO_2-rich fluids can transport comparable amounts of rare metals as in H_2O-dominated solutions. As with previous studies[7], CO_2 can enhance immiscibility and independent gas phase separation, affecting the migration of rare metals.

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