Molybdenum partitioning between felsic silicate melt and coexisting aqueous fluid at 850 °C and 100 MPa

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porphyry-type deposits are major source of molybdenum. A critical step in the formation of porphyry-style ore deposits is the efficient extraction of ore metals (e.g., Cu, Mo, Au, Ag) from arc magmas during exsolution of magmatic volatile phase[1]. In order to figure out the the critical parameters that control Mo partitioning among silicate melts and hydrothermal fluild, experimental studies have demonstrated that fluid-melt Mo partition coefficients ($D_{Mo}{}^{f/m}$) have a linear relationship with salinities (X_{NaCleq}), at the same time, Some reseachers have proposed that the changes of melt composition have an effect on the $D_{Mo}{}^{f/m}$ [2]. Here, we report results of a study designed to experimentally investigate the effect of melt composition on the partitioning behavior of Mo and improve our understanding of the Mo behavior in the process of the fluid-magamatic interaction.

We investigated experimentally $D_{Mo}{}^{f/m}$ in the systems synthetic haplogranite gel-H_2O-NaCl-CO_2 at 1kbar, 850 ^{o}C with Ni-NiO buffer by using rapid-quench cold seal bombs. the starting haplogranite gels were made up with SiO_2, Al_2O_3, Na_2O and K_2O, the compositions are 75wt% SiO_2 with varying Al/(Na+K), Preliminary Experimental data show that $D_{Mo}{}^{fluid/melt}$ has a strong melt compositon dependence, decreasing from 9.35 to 0.56 with the molar ratio of Al/(Na+K) varying from 0.75 to 1.36. The trend is same as that suggested by previous experimental studies.

Porphyry Mo deposits were produced from highly evolved, silica-rich magmas, in the evolution process of magma, the residual magma will deplete aluminum and enrich alkaline such as Na and K, and lead to decrease the ratio Al/(Na+K) of residual magma. According to our experimental results, lower Al/(Na+K) correspond to higher partitioning coefficient of Mo, that means more Mo will enrich in hydrothermal fluids during exsolution of magmatic volatile phase.

[1] Tattitch & Blundy (2017) Am. Mineral. **102**,1987-2006.
[2] Chevychelov & Chevychelova (1997) N. Jb. Miner. Abh. **172,** 101-115.