

Distribution of Sulfur Between Felsic Silicate Melts and Aqueous Fluid

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The distribution of sulfur between haplogranitic melt and aqueous fluid was studied experimentally over a wide range of oxygen fugacity, pressure, and temperature. Oxygen fugacity appears to be the main factor controlling the fluid/melt partition coefficient D . At 850 °C and 2 kbar, D is 49 under hematite-magnetite buffer conditions, 47 close to the Ni-NiO-buffer, but 468 at the Co-CoO-buffer. According to Raman spectra of the quenched fluid, hydrogen sulfide is the dominant sulfur species in the fluid at Co-CoO buffer conditions, while sulfur dioxide dominates at Ni-NiO and hematite-magnetite buffer conditions. Experiments buffered close to Ni-NiO at 850 C showed little pressure dependence of D in the range between 0.5 and 3 kbar. Similarly, changing the temperature from 850 to 750 C at 2 kbar has little effect on D . However, at 3 kbar and conditions close to the Ni-NiO-buffer, D increases from 69 to 137 if temperature decreases from 850 to 750 C. This effect is probably due to the formation of some hydrogen sulfide in the fluid, as the ratio of hydrogen sulfide over sulfur dioxide should increase with increasing pressure and decreasing temperature.