Geophysical Research Abstracts
Vol. 12, EGU2010-8890-1, 2010
EGU General Assembly 2010

The influence of sulfur on platinum solubility in water-saturated silicate melts

Pavel Gorbachev and Nikolay Bezmen
(p_gor@mail.ru)

P.N. Gorbachev1 (IGEM RAS), N.I. Bezmen2 (IEM RAS),
1Institute of Ore Deposits, Petrography, Mineralogy and Geochemistry (I.G.E.M.), Russian Academy of Sciences; p_gor@mail.ru
2 Institute of Experimental Mineralogy Russian Academy of Sciences; bezmen@iem.ac.ru

In order to assess the influence of sulfur on Pt solubility in silicate melts we studied the Pt solubility in S- and H2O-bearing silicate melt. Experimental conditions were the same that the previous studies with S-free silicate melts [1].
Platinum solubility was determined in silicate melt of Di55An35Ab10 composition at oxygen fugacities varying between the HM and IW buffer at 1200ºC and fluid pressure from 2129 to 3211 kbars. Hydrogen mole fraction varied from 0.002 to 0.248; lg fO2 from -6.53 at MMO buffer to -11.86 at IW buffer. Experiments were conducted in a vertically orientated internally heated gas high pressure vessel under conditions of known gas speciation and controlled fugacities. Glass samples were polished before analysis to remove possible contamination by the metal of the capsule and then boiled for 1 h in concentrated HCl. The oxygen fugacity was controlled by the double capsule buffer technique in oxidizing conditions (NM-NNO buffers) and by an Ar-H2-gas mixture at reducing conditions (XH2 > 0.05). Durations of all experiments were 3 days. Platinum concentrations were determined by instrumental neutron activation analysis (INNA).
A significant similarity on Pt solubility in the S-bearing and S-free melts was observed. At reducing conditions (log fO2 < NNO buffer) a systematic decrease of the Pt solubility with decreasing fO2 was observed (from 32.870 to 23.849 ppm for S-bearing and 76.200 to 20.610 ppm for S-free melts respectively). At oxidizing conditions with a higher S concentration in the melt an increase in Pt concentrations was observed (from 24.660 to 54.960 and from 23.400 to 54.781 respectively). The presence of sulfur has a insignificant effect on Pt solubility.
Although our results show that sulfur has a minor influence on the Pt solubility, some experimental data testify to increasing of sulfur influence on the Pt solubility with the increase of fS2 [2]. The slight increase in Pt solubility observed in our experiments can suggest that the influence of sulfur on Pt solubility will intensify at a higher fugacity of sulfur in the fluid and its concentration in the melt.

REFERENCES.
1. Bezmen N.I., Gorbachev P.N. and Shalynin A.I. Solubility of platinum in hydrous haplobasaltic melt at 1200º and =2 kbars. Doklady Earth Sciences, 2006. V. 406. N 4, pp. 500-506 .
2. Amosse J., Dable P., Allibert M. Miner. and Petrol. 2000. V.68. N.1. p. 29-62.