Native iron in association with forsterite, experimental research

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Experimental research of zonal ilmenite formation in low oxygen fugacity conditions was spent on a high-pressure pressless 'split sphere' (BARS type). The investigated sample consisting of a haemoilmenite (Geik 10 mol. %, Ilm 44 mol. %, Hem 46 mol. %), powdered kimberlite and metal titanium was located in a platinum capsule which was placed in a high pressure cell. The longest experiment proceeded 5520 minutes at pressure 2.0±0.25 GPa and temperature 1100 ±20 °C. Highly reducing conditions in a capsule were supported at the expense of the metal titanium, which bonds oxidizing components. As a result of experiments a rim of Mg-rich ilmenite on a grain of haemoilmenite was obtained. It was formed by interaction of haemoilmenite with melt. Thus, the iron reduced from a haemoilmenite was accumulated in a native form in interstitial area, near to a titanium tablet. Native iron composition was estimated by EDS spectrometer (Oxford instruments): Fe 92.4-97.5, P up to 5.9, S up to 3.2, Ni up to 4.5, Ti up to 0.5 (wt.%). Olivine have the following composition near the titanium tablet (wt.%): SiO_2 - 41.06; Cr_2O_3 - 0.04; FeO - 7.67; MnO – 0.06; MgO - 50.27; CaO - 0.18; NiO - 0.41. With increasing distance from a titanium tablet iron content in olivine rises from 7.67 to 14.76 wt.% (Fo 92.1 - 84.5 mol. %).

In this case the dependence of olivine composition from redox conditions is clearly shown. At low values of oxygen fugacity native iron coexists with forsteritic olivine (Fo 92.1). Obtained data indicate the possibility of highly reducing conditions in a mantle at which some silicate phases could lose iron. These results are confirmed by finds of native iron together with Fe-poor silicate inclusions in natural diamonds [1, 2].

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[1] Fedorov *et al.* (1999) *Geochemistry International* **37**, 860–865. [2] Sobolev *et al.* (1981) *Geologiya i Geofizika* **22**, 25–29 (in Russian).

Fluid inclusion and stable isotope studies of the Kharape Epizonal Orogenic Gold Deposit, West Azerbaijan Province, Iran

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The Kharapeh epizonal orogenic gold deposit is located the Sanandaj-Sirjan Zone (SSZ) in the West Azerbaijan province, Iran. The deposit area is underlain by folded Cretaceous metamorphic rocks. The gold-bearing quartz veins are >1 km in length and average about 6 m in width; breccia zones are 10-50 m in length and ≤1 m in width. Four fluid inclusion types were recognized in cogenetic quartz: monophase aqueous inclusions, monophase carbonic inclusions, two-phase aqueous inclusions and three-phase carbonic-aqueous inclusions. Fluid inclusion data suggest mineral deposition at temperatures of at least 220 to 255°C, and depths of at least 1.4-1.8 km, from a H_2O-CO_2±CH_4 fluid of relatively high salinity (12-14 equiv. wt% NaCl). Ore fluid $\delta^{18}O$ values between about 7 and 9 per mil suggest no significant meteoric water input, despite gold deposition in a relatively shallow epizonal environment.