

MINERALIZATION OF THE MAFIC-ULTRAMAFIC ROCKS OF THE LAS AGUILAS – LAS HIGUERAS AREAS, SAN LUIS PROVINCE, ARGENTINA

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Within the Sierras de San Luis, a part of the Sierras Pampeanas (central Argentina), mafic – ultramafic rocks consisting of norites, gabbros, anorthosites, orthopyroxenites and dunites are exposed as lenses and strike about 120 km NNE-SSW with a width of ca. 30 km. The geotectonic setting of the mafic-ultramafic intrusions is thought to be an extensional back-arc basin which developed during the last stages of the Famatinian orogeny. A detailed investigation of a drill core (LASS/3) profile from the Las Aguilas area has been made in order to document the petrography of the mafic-ultramafic rocks as well as the intercalated basement with depth. The study is focused on sulphides, Platinum-group mineral concentrations as well as fluid inclusions. It is shown that these rocks are characterized by a moderate to high-grade base metal sulfide (BMS) mineralization. Sulfides include chalcopyrite, pentlandite and pyrrhotite showing primary magmatic and secondary mineralization textures. The platinum group minerals (PGM) such as merenskyite-melonite group minerals and cobaltite group minerals are related to the BMS and to the Cr-spinel-rich ultramafic part of the intrusion and occur as primary and secondary mineral phases. Primary PGM's occur as inclusions in sulfides and the secondary occur in veins or between BMS and silicates as a result of remobilization and precipitation processes. The secondary PGM's seem to have crystallized at about 500 °C based on the Pd-Bi-Te plot of HOFFMAN & MACLEAN (1976). Textually and geochemically three different types of chromium spinel were distinguished. Type 1) iron-rich spinel with magnetite rim and mainly homogeneous cores. Type 2) show alumina-rich and chromium-poor rims as well as an increasing trend in chromium and iron. Cores point to a decrease in alumina content. Type 3) is a homogenous chromium spinel. These findings are similar to those reported by FERRACUTTI et al. (2006). Three different groups of primary CO₂-N₂-CH₄ inclusions were identified in plagioclase and quartz by last melting temperatures T_m of the carbonic phase and Raman Spectroscopy. Fluid densities are derived from homogenization temperatures T_h of the vapor bubble, which ranges from 16.3 °C to -25.5 °C. Fluid inclusions reflect a decrease in densities with increasing depth within the drill core. It is important to note that the fluid inclusions in the hanging-wall basement at a depth of 40 meters represent the formation conditions of the Famatinian orogenic event of ~6 kbar at 600 °C. Fluid inclusions in samples at 60 meters and 120 meters depth can be related to the pressure and temperature conditions of the mafic-ultramafic intrusion with an estimated pressure of ~4kbar at 600 °C in the footwall.

FERRACUTTI, G., MOGESSIE, A., BJERG, E. (2006): N. Jahrbuch Mineral. Abhandlungen, 183-1, 63-77
HOFFMAN, E. L., MACLEAN, W. H., (1976): Economic Geology, 71, 1461-1468.