

FE-NI-CU-PGE SULFIDE DEPOSIT OF THE VALMAGGIA ULTRAMAFIC BODY, IVREA-VERBANO ZONE, NW ITALY

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The Valmaggia ultramafic body is hosted in the uppermost portion of Main Gabbro unit, which is part of the Ivrea-Verbania Basic Complex (NW Italy). The enveloping unit is made up of an hydrated amphibole and biotite bearing massive gabbro. The ultramafic body is an hydrated Ti-rich amphibole and phlogopite bearing peridotite. Minor phases comprise hercynitic and magnetitic spinel, apatite, zircon, ilmenite and graphite. The main sulfide mineralization occurs within the peridotite, along a 2m wide band at the contact with the enclosing gabbro. It is made of up to centimetric blebs containing the following association: pyrrhotite + pentlandite + chalcopyrite + cubanite + chalcopyrrhotite + mackinawite + sphalerite. PGE chondritic patterns are enriched in Pd, which forms PGM (merenskyte-melonite group) hosted within sulfide blebs. Other minor phases are Pb-Ag-Bi tellurides. Unmixing between sulfide and silicatic liquids was attained at high temperature (1100°C), and sulfide crystallisation occurred in a wide range of temperatures. While minor Fe-rich and Cu-Ni-poor sulfides were trapped inside olivine and low Ca pyroxene at high temperature, the main Cu-Ni rich mineralization formed at quite lower temperature, together with hydrated silicates (Ti-rich amphibole and phlogopite). Minor highly Cu-enriched mineralization, always associated with hydrated phases, occurs also in the gabbro, next to the contact with the peridotite, and is related to percolation of late H₂O-rich fluids from the peridotitic body. High Pb enrichment of peridotite suggests crustal contamination of Valmaggia ultramafic body, whose source cannot be related to the enclosing gabbro.