

Hydrothermal Alteration and Mineralization Footprint of the Čoka Rakita High-Grade Gold Skarn Deposit, Timok, Serbia

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The Čoka Rakita deposit is located in the northwestern part of the Late Cretaceous Timok Magmatic Complex, a metallogenic district in Serbia hosting world-class Cu-Au porphyry (Majdanpek, Veliki Krivelj) and high-sulfidation deposits (Bor, Čukaru Peki). Čoka Rakita is a recent high-grade gold skarn discovery, with unique mineralogical and grade characteristics not only for the Timok district, but for the entire Western Tethyan Belt, with maiden inferred mineral resources of 1.78 Moz of gold.

The main economic mineralization at Čoka Rakita is related to exoskarns, developed as massive stratabound bodies formed by the replacement of a calcareous clastic sedimentary sequence in the hanging wall of a sill-like porphyritic monzodiorite and east of a major monzonitic intrusion. Mineralization also extends into the endoskarn zone of the monzodiorite, up to several meters from the intrusive contact.

Other mineralization types at Čoka Rakita include: (1) porphyry Au-Cu-Mo mineralization in the potassically altered monzodiorite and the epiclastic sequence; and (2) stratabound Cu-Au mineralization at a deeper stratigraphic level within a marble-skarn altered limestone and the overlying conglomerates.

Gold mineralization is dominantly associated to andradite-grossular garnet skarn with minor pyroxene, and K-feldspar, overprinted by retrograde assemblage consisting of epidote, chlorite, calcite, albite and minor actinolite, late-stage andradite and sulfides. Gold occurs in several distinct mineral associations, the main ones being: (1) native gold and pyrite-dominant mineralization, with minor chalcopyrite-bornite; and (2) gold and pyrite-pyrrhotite-magnetite mineralization with minor chalcopyrite-sphalerite-galena-marcasite-tetrahedrite-tennantite-Pb(-Sb) sulfosalts. Gold appears as disseminations and often as visible aggregates, reaching few millimeters in size. Gold is hosted by various gangue and sulfide minerals, mainly by garnet, occupying its pores and microfractures, or less commonly in pyrite, epidote, K-feldspar and albite. Gold almost always contains silver in various proportions (up to 10 wt.% Ag), as revealed by preliminary SEM-EDS analyses.