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Precious metals assemblages at the Mikheevskoe porphyry copper deposit (South Urals, Russia) as proxies of epithermal overprinting

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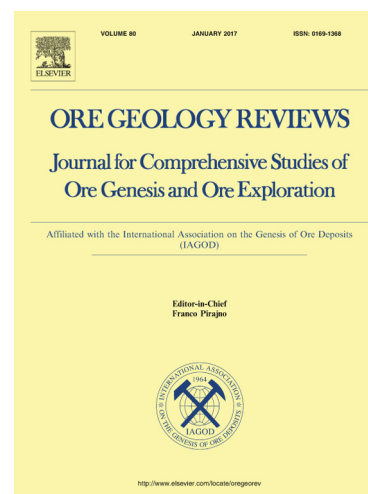
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1 **Precious metals assemblages at the Mikheevskoe porphyry copper**
2 **deposit (South Urals, Russia) as proxies of epithermal overprinting**

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15
16 **Abstract**

17 Mineral assemblages and formation conditions of precious metals (Au, Ag, PGE) in ores of
18 the Mikheevskoe porphyry copper deposit (South Urals) are the subject of our study. Three
19 mineralization types can be distinguished: (1) Gold-silver-telluride mineralization overlapping
20 porphyry-style bornite-chalcopyrite ores includes native gold (fineness 863-873), electrum
21 (fineness 593-672), galena, hessite, coloradoite, and, more rarely, petzite, stützite, Au-Ag
22 ditellurides, native tellurium, tellurobismuthite, tetradymite–kawazulite, altaite, and extremely
23 rare melonite NiTe₂, merenskyite PdTe₂, and sopcheite Ag₄Pd₃Te₄; (2) Gold-arsenopyrite-base-
24 metal mineralization within quartz-tetrahedrite-sphalerite veinlets cutting porphyry-style
25 mineralization; (3) Gold-telluride mineralization with argillic alteration and mineralogically similar
26 to that of type (1) but distinct because of the presence of Au-Ag, Ag, and Pb selenides. Textural
27 relationships supported by fluid inclusions data and chlorite geothermometry provide evidence
28 that occurrence of precious metals minerals at the Mikheevskoe deposit is mostly linked to
29 epithermal overprint of the porphyry mineralization and was deposited at ca. 300 to 200°C from
30 moderately saline fluids (ca. 5 to 10 wt.-%-eq.NaCl). It is suggested that the observed variability in
31 Au and Ag minerals results from small fluctuations of S₂ and/or Te₂ fugacity.

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