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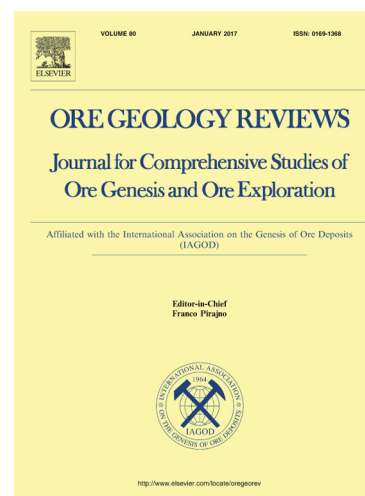
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Geological characteristics and geochronology of the Takht-e-Gonbad copper deposit, SE Iran: a variant of porphyry type deposits

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ABSTRACT

The Takht-e-Gonbad, or simply Takht, copper deposit in the Kerman belt in southern section of the Cenozoic Urumieh-Dokhtar magmatic arc (UDMA) of Iran is spatially associated with late Oligocene shallow granodiorite porphyries intruded into pyroclastic rocks. Hypogene ore minerals include pyrite, chalcopyrite, magnetite and rare molybdenite and bornite, occurring as veinlets and disseminations mostly in the pyroclastic rocks. Hydrothermal alteration is marked by an extensive phyllic assemblage and irregular zones of propylitic and calc-silicate assemblages with no consistent zoning patterns. The various igneous rocks at Takht area are calc-alkaline to shoshonitic, and are distinguished by enrichments in LILEs relative to HFSEs, and LREEs relative to HREEs ($14.41 \geq La_N/Yb_N \geq 2.85$). These features suggest a subduction-related setting for the rocks and the associated copper deposit in the area. A late Oligocene age is obtained for the main Takht granodiorite porphyry and the granodiorite batholith (24.2 Ma and 25.0 Ma, respectively, zircon U-Pb). The age of the main Takht porphyry is distinctly older than the middle-late Miocene ages reported for most porphyry Cu deposits occurring to the north of the Takht deposit, including the world-class Sarcheshmeh and Meiduk.

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