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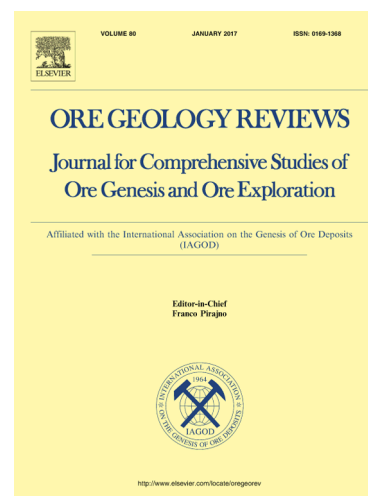
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**Genesis of the Yandong porphyry Cu deposit in eastern Tianshan, NW China: Evidence from geology, fluid inclusions and isotope systematics**

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**Abstract:** The Yandong porphyry Cu deposit (372 Mt at 0.58% Cu and 0.06 g/t Au) is located in the center of the eastern Tianshan, Xinjiang, NW China. Multiple-stage hydrothermal activities have resulted in potassic, chlorite-sericite, phyllic, and propylitic alteration in this deposit. The Yandong deposit formed in four stages, i.e., an early quartz ± magnetite ± pyrite stage (I), a quartz + pyrite ± chalcopyrite stage (II), a quartz + chalcopyrite ± pyrite ± molybdenite stage (III), and a late quartz + carbonate stage (IV). Three evolutionary episodes were observed by a detailed fluid inclusion study: (1) Early ore stage (I) fluids were trapped under two-phase conditions, as evidenced by the coexistence of vapor-rich (V-type) inclusions (homogenization temperatures = 410 – 494°C, average salinity = 2.2 wt% NaCl equiv), liquid-rich (L-type) inclusions (homogenization temperatures = 311 – 430°C, average salinity = 9.5 wt% NaCl equiv) and hypersaline (H-type) inclusions (trapped at ~300 bars, or a depth of approximately 1 km assuming lithostatic pressure conditions). (2) Main ore stage (II and III) fluid inclusions in quartz were also trapped under two-phase conditions (boiling), as identified by the coexistence of V- and L-type fluid inclusions; L-type inclusions homogenized between 161 and 390°C (average = 270°C), with salinities of 1.6 to 9.9 wt % NaCl equiv (average = 4.9 wt% NaCl equiv) and a depth of ~1 km (~100 bars, hydrostatic pressure conditions). (3) Late ore stage (IV) fluids

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