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## **Geochemical characteristics and metallogenic significance of igneous rocks from Zhunuo porphyry copper deposit, Tibet**

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The Zhunuo porphyry copper deposit is located in the western region of Gangdese metallogenic belt of Tibet; the ore body is hosted in granite porphyry and quartz porphyry, which is intruded by dioritic porphyrite and lamprophyre. The zircon ages of these igneous rocks are determined by LA-ICP-MS method, which are as follows: granite porphyry,  $13.70 \pm 0.5 / -0.2$  Ma (MSWD=3.2); quartz porphyry, mainly  $11.6 \pm 0.2$  Ma (MSWD=1.4), and also has  $13.6 \pm 0.1 / -0.7$  Ma (MSWD=1.2) and  $16 \sim 18.7$  Ma meaningful ages; dioritic porphyrite,  $12.30 \pm 0.3 / -1.0$  Ma (MSWD=29); lamprophyre,  $13.7 \pm 1.0 / -1.5$  Ma (MSWD=13). Inherited zircon are found in all these magmatic rocks, especially lamprophyre, which has very old zircon ages. All the zircon dated have an igneous genesis, which are distinguished by trace elements characteristics of zircon. According to Ti in zircon geothermometer, the crystallization temperature of granite porphyry is the highest, the dioritic porphyrite and lamprophyre follow, the quartz porphyry is the lowest one, which has the most complex relationship between temperature and the age. The geochemical characteristics of granite porphyry and quartz porphyry are the same as potassic adakitic rocks, such as intensity rich in LILE, depleted in HFSE, high LREE/HREE ratios, and low compatible elements content etc.; however, these are different to east and west areas of Gangdese belt with more radiogenetic Sr and non-radiogenetic Nd, which can be explained by the juvenile lower crustal source for the latter, and hybrid source of Tethys ocean crust and old lower crust for the former. Lamprophyre has the same geochemical characteristics with post-collision ultrapotassic igneous rocks, the Sr-Nd isotope character of which are implicated to be generated from enriched mantle, which is formed by metasomatism of subduction sediments. Dioritic porphyrite are the hybrid production of potassic adakitic rocks and ultrapotassic igneous rocks. The temporal and spatial distributing of potassic adakitic and ultrapotassic igneous rocks implicated not restricted in NS-striking rift system, magma intrusion and rifting are the different manifestation of deep seated structure mechanism of Lhasa block. The coexistence of potassic adakitic and ultrapotassic igneous rocks in Zhunuo deposit maybe provide clues for prospecting so that we can find porphyry deposits in area where ultrapotassic rocks intruded.

**Key Words:** Gangdese belt, Porphyry copper deposit, Zircon Geochronology, Ti in Zircon geothermometer, Geochemistry, Prospecting implication

