

# Geochronology and Zircon Hf Isotope of Meta-basic rocks from Jinchuan Mineral Area and Its Geological Significance

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**Abstract:** Igneous rocks are widespread in Jinchuan mineral area. However, previous research focused on the ore-bearing mafic-ultramafic host rocks, while little attention has been paid to the others. The objects of this paper are meta-basic rocks in the northwest side of Jinchuan mineral area, which occur as vein. Geochemically, the meta-basic rocks are characterized by basic rock (48.96%~49.63%) and tholeiitic series with low K<sub>2</sub>O (Na<sub>2</sub>O/K<sub>2</sub>O=1.37~1.72) and high TFe<sub>2</sub>O<sub>3</sub> (15.52%~15.92%). The trace elements of the meta-basic rocks have high total REE contents (235.01~242.37 μg/g), strong enrichment of LREEs (La<sub>N</sub>/Yb<sub>N</sub>=8.48~9.32) and LILEs (Rb, Ba and U), with relative depletion of HREEs and HFSEs (Nb, Ta, and Th). Using single zircon LA-ICP-MS U-Pb dating, the emplacement age of the meta-basic rocks was determined at 2044±14 Ma. The primary zircons have non-uniform and positive ε<sub>Hf</sub>(t) value (2.97 to 10.89). The geochemical characteristics indicate that the meta-basic rocks formed in an extensional rift intraplate environment, and the parental magma are derived from depleted mantle source and have weak assimilation of crustal materials (~10%). Combined with previous zircon U-Pb-Hf data, the crustal growth events took place at about 2.2~2.0 Ga in intraplate setting in the area, and a late Archean crustal growth event (2.8~2.5 Ga) may be present.

**Keywords:** meta-basic rock; zircon U-Pb dating; Hf isotope; tectonic setting; Jinchuan mineral area