

# The *In-situ* Pb Isotopic Compositions of Jiama Porphyry–Skarn Copper–Polymetallic Deposit, Tibet, China

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**Abstract:** The ore-forming periods of Jiama porphyry–skarn copper–polymetallic deposit are divided into pre-mineralization period and skarn-mineralization period (including Cu–Mo stage, Cu–Bi stage, Fe–Cu stage and Cu–Pb–Zn stage). This paper presents *in-situ* Pb isotopic compositions of major sulfides and feldspars from Jiama deposit determined by using a femtosecond laser–ablation multi–collector inductively coupled plasma mass spectrometry (fsLA–MC–ICP–MS). These results are roughly in agreement with those of previous studies utilizing the chemical solution method, indicating that *in-situ* micro-analytical method for Pb isotope is highly reliable. The Pb isotopic compositions of sulfides at different stages are slightly variable but overall identical, implying that the corresponding ore-forming materials are derived from the same magmatic source. The Pb isotopic compositions of K–feldspars and plagioclases reveal that the granite porphyry is directly related to the formation of Jiama deposit and the granodiorite porphyry is probably not associated with mineralization. This study proposes that the magmas originated from partial melting of the newly thickened juvenile lower crust, involved with relatively abundant mantle-derived materials, supplied sufficient metals of Cu and Au for the generation of the giant Jiama deposit.

**Keywords:** Jiama deposit; femtosecond laser–ablation; Pb isotopic composition; ore-forming material