Petrogenesis of Granites in the Banchang Cu-Mo deposits， East Qinling, central China: Evidence from LA-ICP-MS zircon U-Pb dating, trace element and Lu-Hf isotope geochemistry

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Paleozoic and Mesozoic granitoids are widespread in the southern margin of the North China Craton, and of particular geological interests because of their indication for lithospheric evolution and association with skarn-porphyry Cu-Mo mineration. In order to constrain the emplacement time and discuss the petrogenesis of the hosting granites of Banchang skarn-porphyry Cu-Mo deposit, Henan Province, China, LA-ICP-MS U-Pb , Lu-Hf isotope and trace element analyses of zircon were completed in this contribution. The granites are strongly peraluminous with A/CNK=1.09-1.17, high SiO_2-K_2O contents and different K_2O/Na_2O ratio, geochemical analysis shows a petrogenesis of typical S-type granites mixed with some M-type plagiogranite. Molybdenite Re-Os isotopes model age of six porphyry samples are 149.8±2.4Ma to 151.5±2.3Ma, indicating that the metallogenic epoch was late Jurassic. While samples of zircon U-Pb weighted isochron age of granite porphyry is 426.43±0.99 Ma, syenogranite in south side is 430.7±1.3 Ma. Evidence show that 5km southside of the deposit, a sample of granodiorite zircon U-Pb age is 150.65±0.56 Ma. These age dates confirm that the intrusion and mineralization were initiated in different period. The Re contents of the molybdenite are up to 99.3×10-6 on average, and much higher than that of the molybdenum deposits in the south margin of North China craton occurred in late Jurassic. The higher Ce/Ce* ratios of the zircon crystals in the Paleozoic granite porphyry compared to those in the late Jurassic granodiorite,suggests that fluids exsolved from oxidic magmas might be more favorable for Mo enrichment. The$\varepsilon Hf(t)$ and $^{176}Hf/^{177}Hf$ values of the Paleozoic granites fall into the ranges from -2.6 to -0.9, and 0.282438 to 0.282485, Mesozoic granites from -4.6 to -0.5, and 0.282551 to 0.282670,the two stage Hf model ages are (1337 to 1430 Ma) and (1093 to 1324 Ma). Together with the ages of local strata, these evidence suggests that the parent magma were dominatly sourced from crustal source, input of a mantle component. The intensive lithospheric thinning in the southern margin of the North China Craton in Mesozoic may have play an important role during the ore-forming processes.