Li and B isotope characteristics of ultrahigh-pressure metamorphic rocks from Sulu, China

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We analyzed the Li and B isotopic composition of metamorphic rocks from Sulu recovered by the Chinese Continental Drilling Program to constrain the behavior of Li and B and their isotopes through dehydration of subducted crust up to conditions of ultrahigh-pressure (UHP) metamorphism and to rehydration during exhumation of UHP rocks. The analyzed samples show large variations in both Li content and δ^7Li, ranging from 4 to 29 ppm and -12.4 to 0.5‰ for fresh eclogite, 8 to 22 ppm and -3.6 to +3.6‰ for retrogressed eclogite, and 1.2 to 11.6 ppm and 1 to 3.1‰ for ultramafic rocks, respectively. Most samples are characterised by very low B contents (<1ppm), with δ^{11}B values varying from -14 to 0‰ for fresh eclogite, -10 to -1‰ for retrogressed eclogite , and -3 to +12‰ for ultramafic rocks. The Li and B isotope data indicate that isotopically heavy continental basaltic rocks have been transformed during subduction into isotopically light eclogites. Fluids released from the subducted rocks may (i) induce local melting and eventually be "stored" in local melt pockets and veins within restitic rocks or (ii) metasomatize mantle rocks. In both cases, mobilization of Li and B through the fluids results in large heterogeneities in the concentrations of Li and B, δ^7Li and δ^{11}B on centimeter to decimeter scale. For instance, higher B content and heavier δ^{11}B value in garnet peridotite relative to neighboring eclogite (subducted crustal rocks) indicate that mantle-derived rocks were metasomatized by fluids released from the subducted slab. Similar small-scale isotopic heterogeneity is also found between fresh and amphibolized eclogite, illustrating the addition of isotopically heavier Li and B during retrogression. Because of the superposition of the effects of dehydration and retrogression and the mineralogical control on the partitioning and isotopic fractionation of Li and B, Li and B and their isotopes may or may not behave coherently in the same system during slab subduction and subsequent exhumation of UHP rocks.

Study on fluid inclusions of Cu-Au skarn deposits in the Tongling region, Anhui Province

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Introduction

The Tongling region is an important ore district of the Yangtze metallogenic belt in east China. Its representative of skarn deposits are world famous (e.g., Chang *et al*. 1991; Pan and Dong 1999;Yang and Lee, 2006). This study focus on the compositions and temperature of fluid inclusions of these Cu-Au deposits as well as their genesis.

Experiment and Results

The chemical compositions of fluid inclusions are determined with RM-1000 laser Raman spectroscopy produced by Renishaw Company, at the State Key Lab of Geol. Proc. & Mineral Res., China Univ. Geosci. Three types of fluid inclusions: daughter mineral, gas-rich and liquid inclusion have been identified. Compositions of fluid inclusions are mainly composed of H_2O, CO_2 and CH_4 with homogenization temperature from 106℃ to 441 ℃. Boiling is an important factor during Cu-Au mineralization provided by coexisting daughter minerals and gas-rich inclusions, indicating that the ore-forming fluids were experienced an evolution from high temperatture to moderate one. Evidences from this study and the previous isotopes deduced that ore-forming fluids of Tongling Cu-Au deposits are magmatic in origin. Temperature at boiling state led to enrichment of large amounts of copper and gold during rock-fluid interaction.

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