A LA-ICP-MS study of garnet from the Nihe iron deposit, Anhui Province, China

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The Luzong volcanic basin is located at the central part of the Middle and Lower Yangtze River area and contains numerous important Cu-Au-Fe deposits. The Nihe iron deposit is a newly discovered large scale iron deposit in the western part of the Luzong volcanic basin. In the contact zone of the diorite porphyry intrusion and the trachyandesite of Zhuanqiao Formation occur anumbers of garnet in the Nihe iron deposit. This study presents LA-ICP-MS data for garnets from the Nihe iron deposit, discusses the factors controlling incorporation of trace elements into garnets, and strengthens the potential of garnet trace elements geochemistry as a tool to help understand the evolution of hydrothermal fluids.

Garnets from the Nihe iron deposit range from $Adr_{48}Grs_{52}$ to almost pure andradite (Adr>99). LA-ICP-MS data show that the garnet have detectible Zr, V, U, Sc, Nb, Th, Zn, Ga, Cr, Ge, Hf, Sr, Ta, Pb and REE (∑442~1301ppm, avg. 812ppm). All the garnets are show typical LREE-enriched and HREE-depleted patterns, with a strong positive Eu anomaly. Incorporation of trace element into garnet is in part controlled by its crystal chemistry, with a coupled substitution mechanism(eg. $[X^{2+}]$ VIII -1$[REE^{3+}]$ VIII +1 $[Si^{4+}]$ IV -1 $[Z^{3+}]$ IV +1). Variations in textural, optical features and geochemistry of the garnet are largely controlled by fluid composition. Garnet composition and zonation record the history of the hydrothermal fluid and can be used to identify fluid changes in physicochemical properties.

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Formation mechanism of foliated (garnet-bearing) granites of the Tongbai-Dabie orogenic belt: Evidence from the Mamiao cross section

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High pressure (HP) metamorphic rocks are important for understanding the genesis of the foliated (garnet-bearing) (FGB) granites in the Tongbai-Dabie orogenic belt. Based on a study on geochemistry of HP metamorphic rocks and FGB granites from the Mamiao cross section in the Tongbai-Dabie orogenic belt, the relationship between these rocks are discussed. The regular pattern of variation trends of elemental compositions of the HP metamorphic rocks, as well as the similarity in the isotopic compositions suggests the continuous evolutional relationship of retrograde metamorphism between the HP rocks. The changes in elemental compositions between HP gneisses and FGB granites are significantly different from variations of elemental compositions occurred during the retrograde metamorphism of HP eclogites. These differences in geochemistry presented in this study and previous studies suggest that there is no continuous evolutional relationship of retrograde metamorphism between the FGB granites and the HP metamorphic rocks. The magma source of the FGB granites was most likely from retrograded metamorphism and depressional partial melting of the UHP gneisses.

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