Helium and sulfur isotopic geochemistry of Furong tin deposit in Hunan Province

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The Furong tin deposit is a newly discovered super-large tin deposit. It is located at the south of the Qitianling granite in South Hunan. It is closely connected with the Qitianling A-type granite complex both in time and in space. This deposit differs from other tin deposits associated with S-type granite.

The helium and sulfur isotopes of sulfide samples from Furong tin deposit are measured. The $^3He/^4He$ ratios in fluid inclusions from14 sulfides range from 0.13 R_a to 2.95R_a. In general, the $^3He/^4He$ ratio of the mantle is 6~7Ra, that of the crust is 0.01~0.05Ra. Compared to the $^3He/^4He$ ratios of Furong tin deposit, the ore forming fluid in this deposit can be considered as a mixture of two end-member components, the mantle fluid and the crustal fluid. The$\delta^{34}S$ ratios of 31 sulfides vary in the range of -22.8‰~+0.1‰. Except a few samples, most samples show relatively homogenization signatures in sulfur isotope composition, with$\delta^{34}S$ ranging from +0.1‰ to +9.1‰. This suggests that the sulfur might be derived from a magmatic fluid. This conclusion is in accordance with the helium isotope result.

The Qitianling granite belongs to A-type granite which formed in a post-orogenic extensional settings. Furong tin deposit is located at the contact zone (outer or inner) or granite of Qitianling granite, and its main tin-mineralization time is consistent with the intrusion time of Qitianling granite. The relationship reflects that their forming settings of geodynamics might relate with the Mesozoic lithospheric extension in South China.

Magmatic zoning in amazonian paleoproterozoic A-type granites

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The 1.88 Ga, oxidized A-type granitic plutons of the Jamon Suite, eastern Amazonian craton, Brazil, are intrusive in Archean granite-greenstone units. The less evolved rocks are biotite-hornblende monzogranites, locally enriched in cumulatic amphibole ± clinopyroxene, that are concentrated in the border of the plutons. They are followed successively to the center of the plutons for biotite monzogranites and leucogranites, the latter defining generally small circular structures. Aeroradiometric surveys put in evidence the magmatic zoning of the plutons with increasing radiometric values being found in the more evolved leucogranites in the center of the bodies. All facies of the Jamon Suite are magnetite-bearing granites. Magnetic susceptibility decreases from the facies with higher modal mafic contents to the leucogranites, that is from the border to the center of the plutons. The magmatic zoning is marked by the decrease of modal mafic mineral content, plagioclase/potassium feldspar, amphibole/biotite and anorthite content of plagioclase. TiO_2, MgO, FeO_t, CaO, P_2O_5, Ba, Sr, and Zr decrease, and SiO_2, K_2O, and Rb increase in the same way. Magmatic differentiation was controlled by fractionation of early crystallized phases, including amphibole±clinopyroxene, andesine to calcic oligoclase, ilmenite, magnetite, apatite, and zircon. Negative Eu anomalies increased with differentiation. Fractional crystallization was the dominant process of magmatic evolution but magma mingling processes involving coarse biotite granites and leucogranites were also observed.