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Iron isotope fractionation during skarn-type alteration

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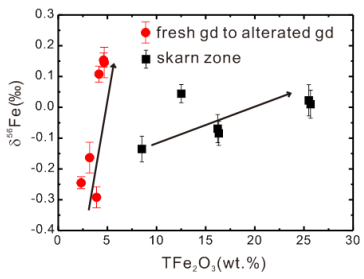
A well developed skarn profile of the Tongshan copper-molybdenum deposit, along the Middle-Lower Yangtze River metallic belt was studied here to evaluate the Fe isotope fractionation mechenisim during skarn alteration. This skarn profile is a newly exposed profile by engineering excavation, providing some of the freshest samples. This skarn profile is about 4 meters long, composed by fresh granidiorite (gd) zone, altered gd zone with diopside, chlorite and epidote alteration, garnet-rich zone and diopside-rich zone with magnetite and chalcopyrite mineralization and finally marble zone. The whole geochemical data show that iron was enriched in garnet-rich zone (from 15 wt.%~25 wt.%) and relatively rich in later diopside-rich zone(15wt.%~5wt.%). The iron isotope show large viaration in this profile, range from -0.63‰ to +0.15‰. The fresh gd have a mantle like Fe isotope compositions(~0.15‰). It shows lighter Fe isotope in alteraed gd zone than unaltered gd, from +0.15‰ to -0.16‰. We found a good steep positive coorelatoin between TFe_2O_3 and $\delta^{56}Fe$ in fresh gd and altered gd zone. The garnet rich zone have Fe isotope rise back to ~0‰ ± 0.05‰, but relatively lower than the fresh gd. The marble have the lowest Fe isotope ratios (-0.63‰). There also have a gently positive correlation between TFe_2O_3 and $\delta^{56}Fe$ in the garnet-rich skarn zone and diorite-rich zone. The results also shows that Fe(III) was easy leached than Fe(II) in the whole magmatic hydrothermal system and iron isotope can be as an important tracer in deciphering iron migration process in magmatic hydrothermal system.



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