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Fe isotope fractionation in the Jinchuan Ni-Cu-PGE deposit, China

LEI CHEN[1], XIN DING[2], WEN ZHANG[3], YANTONG FENG[3] AND RYAN MATHUR[4]

[1]China University of Geosciences Beijing
[2]University of Science and Technology of China
[3]China University of Geosciences (Wuhan)
[4]Juniata College

Presenting Author: chenlei1211@gmail.com

Pyrrhotite and pentlandite are the most common Fe sulfide minerals in magmatic ore deposits and meteorites. Multiple S isotopes pairing with Fe isotopes of bulk Fe sulfides have proven to be useful tracers to constrain the formation and evolution of magmatic ore deposits. However, pyrrhotite coexists with pentlandite and other sulfides as intergrowth textures in most cases. This makes the isotope results obtained from bulk samples represent a mixed signal. To better constraint the origin and evolution of magmatic sulfide deposits, *in situ* analyses of sulfides would be required.

In this study, we report on the Fe isotopic compositions of a suite of sulfides from ores (pyrrhotite, pentlandite, and chalcopyrite) from the Jinchuan Ni-Cu-PGE deposit, China. We measured sulfides δ^{56}Fe (relative to IRMM-014) *in situ* with femtosecond laser ablation coupled to a Neptune Plus MC-ICP-MS at the China University of Geosciences (Wuhan). The δ^{56}Fe value of pyrrhotite samples (n=31) ranges from -2.83‰ to -0.35‰, the δ^{56}Fe value of pentlandite samples (n=34) ranges from -0.54‰ to 2.24‰, and the δ^{56}Fe value of chalcopyrite samples (n=28) ranges from -0.74‰ to 1.60‰. Our results indicate that significant Fe isotope fractionation during the processes in the formation and evolution of deposits containing magmatic sulfide.