Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.17205

Iron and oxygen isotope compositions of magnetite from Shinyemi skarn deposit in South Korea

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Skarn deposit is one of major Fe sources worldwide as well as in East Asia region. Shinyemi skarn Fe deposit located in the Taebaeksan Metallogenic Belt of central eastern part of Korean Peninsula is a few iron mine under operation in Republic of Korea. However, origin and formation processes of iron ore remains ambiguous despite previous petrographic and mineralogical studies. Here we report Iron (δ56Fe) and oxygen (δ18O) isotopic compositions of magnetite, main ore mineral, to understand the origin and ore-forming processes of the deposit combined with geochronological and trace elemental data.

Zircon U-Pb age of intrusion and muscovite Ar-Ar age of altered zone with petrological observations indicate that Mesozoic intrusive complex triggered a widespread hydrothermal alteration of carbonate host rocks and skarn mineralization in the Shinyemi Fe deposit. Major and trace elements compositions of magnetite also show that the fluid-rock interaction might act as a major ore-forming processes in the study area. Both δ56Fe and δ18O values of magnetite consistently indicate a magmatic-hydrothermal origin.