

**Characteristics of high Silica
Magnetite and It's indication to the
Origin of Yushiwa Iron deposit,
Wuan, Hebei province
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Yushiwa Iron deposit is the second largest iron deposit in Han-Xing metallogenic belt, North China craton. The origin of this kind of iron deposit is still debated. We study the geochemistry of magnetite from the different part of the profile of the orebody in the Yushiwa deposit. Magnetite as a vein in the carbonatites has high SiO₂ (1.89-3.23 wt%, average 2.69 wt%), MgO (0.24-0.42, average 0.32 Wt%), Sr (3.05ppm), Pb (3.9ppm), U (0.35ppm), Sb(0.51ppm), and low TiO₂ (0.03-0.05wt%), Hf (0.07ppm). This kind of magnetite occurs in the upper part of the iron deposit. Magnetite as a vein in the diorites has medium SiO₂ (0.40-1.12 wt%), TiO₂ (0.11-0.26 wt%), Hf (0.17 ppm) and low Sr (1.7 ppm), Pb (0.27 ppm), U (0.07 ppm), Sb (0.04ppm). This kind of magnetite occurs in the middle of the iron deposit. Magnetite in the massive ores has low SiO₂ (0.04-0.59 wt%, average 0.17%), MgO (0.04 wt%), U (0.07ppm), Pb (0.4 ppm), Sr (1.6 ppm), Sb (0.04 ppm), and high TiO₂ (0.50-2.39 wt%, average 1.37 wt%), Hf (0.28 ppm). This kind of magnetite usually occurs in the low part of the iron deposit.

We think that the high silica magnetites are formed from the low temperature. Hence, the volatile and highly mobile components are the main factors defining the emplacement of silica into the magnetite crystal structure. Fluorine is the key element for which conditions of crystallization of the high silica magnetites.

The study of magnetite composition gives an indication of Yushiwa Fe deposit include following processes: (1) "melt-fluid bearing Fe" form in the deep chamber; (2) then "melt-fluid bearing Fe" rising along the conduit with fluid overpressure in the deep chamber; (3) different composition of magnetite in the different parts of the conduit were due to the change of T, P, and oxygen fugacity. Magnetites formed in the high temperature occur characteristics of high TiO₂ and low SiO₂; However, these magnetites formed in the low temperature occur the characteristics of high silica.