Two types of magnetite in a diabase-hosted iron deposit, northern Xinjiang, NW China

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The Central Asian Orogenic Belt (CAOB), also known as Altaid tectonic collage, was a major site of continental growth and ore deposits formation during Phanerozoic time. Located in the southern part of the CAOB, the northern Xinjiang contains large volumes of Paleozoic volcanic and intrusive rocks, as well as a number of economic Fe, Au, magmatic Cu-Ni, and porphyry Cu-Mo deposits [1-3].

Many of these iron deposits are hosted in volcanic and subvolcanic rocks with well-developed skarn-type mineral assemblages. Cihai is one of the largest iron deposits (>100 Mt at 45% Fe) in the northern Xinjiang and is spatially associated with the diabase. The skarn mineral assemblages are the alteration products of diabase. Magnetite grains in the disseminated ores are closely associated and in textural equilibrium with garnet and clinopyroxene. Massive iron ores are composed primarily of magnetites, with minor amphibole, calcite, epidote, and ilvaite.

Two types of magnetite, namely early magnetite (Mt_1) and late magnetite (Mt_2), have been recognized in the iron ores. The early formed magnetites are in equilibrium with prograde skarn minerals and have high Ti (>0.2 wt% TiO_2) and low Si (<0.2 wt% SiO_2) content whereas late magnetites have high Si (>3 wt% SiO_2) and low Ti (<0.1 wt% TiO_2) content. Both the Mt_1 and Mt_2 are of hydrothermal origin. The Mt_1 was formed from high temperature fluids and the Mt_2 was the product of lower temperature fluids. The relatively high Ti content in Mt_1 may be inherited from the diabase protoliths rather than directly crystallized from iron-rich melts.

[1] Zheng et al (2015) *Ore Geol Rev* **67**, 244-254. [2] Zheng et al (2016) *Lithos* **260**, 371-383. [3] Zheng et al (2017) *Ore Geol Rev* **86**, 404-425.