1 Introduction

Most skarns are closely related to intrusion and carbonate rocks. However, they also can occur in lots of different settings including shear zones, sea floor and shallow geothermal systems (Meinert et al., 2005). The Cihai iron deposit is hosted in diabase with well-developed skarn assemblages. Unlike typical skarn deposit, there is no carbonate rocks observed in the open pit of Cihai iron deposit, here we report the detailed information about this deposit and wish to shed some new light on this type of skarn deposit.

2 Ore Deposit Geology

The Cihai iron deposit is located in the Beishan region, southern part of eastern Tianshan. The Beishan area is mainly comprised of Precambrian crystalline basement and overlying sedimentary rocks. It is considered to be an orogeny in early Paleozoic, and evolved into a continental rift in the late Paleozoic.

The strata exposed in the Cihai ore district are mainly composed of the Mesoproterozoic schist and marble, and Permian tuff, volcanic breccia, andesite, basalt, glutenite and sandstone.

Intrusive rocks are exposed widely in the central parts of Cihai ore district, and are predominantly gabbro and granite stocks, multiple pulses of dykes of diabase are emplaced into gabbros and Mesoproterozoic strata. The diabase dykes are the most common intrusive rocks and occur within the Cihai ore district, and are spatially associated with iron mineralization. The main iron ores in Cihai skarns are magnetite. The ore bodies are nearly parallel and showing stratiform, lenticular, and vein shapes, and the diabase and garnet-pyroxene skarn are the direct wall rock of a single ore body (Fig. 1). The massive and disseminated are the mainly ore types of Cihai mining section, and small amount of banded and brecciated ore types have also been recognized.

Disseminated ores are predominantly composed of prograde skarn minerals including garnet and clinopyroxene, with minor magnetite. The massive ores are mainly composed of magnetite, amphibole, epidote and calcite, with minor sulfides. Some prograde skarn mineral such as garnet are replaced by retrograde amphibole.

3 Ore Genesis

The ore genesis of Cihai remains a controversial issue.
It has been proposed that the Cihai iron deposit experienced direct magmatic differentiation mainly based on the high TiO₂ (some with TiO₂ up to 1.56%) content in some magnetite grains (Wang et al., 2006). The field relationships between the igneous rocks and the alteration and Fe mineralization reveal the following pattern: (1) iron ore body and garnet-pyroxene skarns mainly occurred in the hosting diabase; (2) incipient Fe disseminated mineralization mainly restricted to the early prograde skarn; (3) the massive Fe mineralization closely associated with later retrograde skarn. Fluid inclusions in garnet and pyroxene yield higher homogenization temperatures than those fluid inclusions in epidote.

Our data reveal that there are some magnetite grains contain high TiO₂, however, the high TiO₂ magnetite only occur in the disseminated ores which formed in the early mineralization stage, and the TiO₂ content decrease with ore forming processes. The composition of magnetite grains from the disseminated ores, banded ores, and massive ores suggest that Cihai iron deposit is of hydrothermal origin (Dupuis and Beaudoin, 2011). These characteristics indicate that Cihai is a hydrothermal skarn iron deposit.

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References