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The Geological Features and Genesis of Scheelite Deposit in Pingtan, Chengbu County, Hunan Province, China

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South China is the important origin of tungsten ore, where separated wolframite or wolframite, scheelite deposit are the main tungsten deposit, while independent scheelite deposit is rare. However, the Pingtan scheelite deposit found in Chengbu County, Hunan Province, China, recently, which is of large scale. In this case, we summarize the geologic feature of this deposit in order to instruct prospecting of scheelite in the further. In this paper, we study on the scheelite by general survey of trenching, drilling, core sampling and geological mapping etc.

1 Geological Background

This area is located in southwest transition zone of south-crack in Yangzi in Hunan, north contact Zone of Miaoyer Mountain composite rock body. Xuefeng period, Caledonia period, Yanshanian period movements lead to complex structure in research area, which can be divided in four categories: NE, NNE-trending, SN-trending and EW-trending structures. Miaoyer Mountain multiple intrusions are formed during Caledonia period, in lithology, are granite with few diorite gabbros, and appear as a batholith intruded in Early-Precambrian stratum, with the late stock and dikes inside.

2 Geological Features of the Deposit

2.1 Stratum

Stratums exposed in this area are Neoproterozoic Qingbaikouan System, Nanhuan System, Sinian (Ediacaran) system; Cambrian System and Devonian System; with a few Quaternary loose deposit sporadic distribution. The main rock types are silt-slate, pink siltstone, sandstones. Wall rock is consisted of silt-slate of the Huangshidong Group, Qingbaikouan System.

2.2 Magmatic rock

There are Phase I Silurian biotite adamellite, Phase II Silurian biotite adamellite, coarse grain adamellite and fine-grained granite exposed in this region, among which, the Phase II granite is main ore-rich rocks.

2.3 Ore body feature

Three lodes were found in the area, normal length is around 500-700m, and the longest one is up to 6000m; thickness of the ore is generally 1.00-26.32m, and the thickest is up to 80m; dip direction is 270°-290° with dip angle of 65°-75°. The ore bodies are fault-controlled, most orebodies appears in rock broken belt of its contact belt, as forms of vein, plate-shaped, lentoid, while a small number of which occurs in broken belt in granite. The mineralized belt is changed greatly by width which is middle-wide and SN-narrow, and it's not uniform mineralized.

2.4 Ore structure

The main ore texture include grain texture, metasomatic texture, cataclastic texture, blastogranite texture and granoblastic texture, palimpsest porphyritic structure etc, and the main ore structure are disseminated structure, block structure, veinlet structure, gneissic structure.

The main types of ore are simple such as cataclastic altered granite scheelite; a few are scheelite ore containing quartz. Besides W, there are other useful elements such as Mo, Sn, Bi, Cu, Ag, Fe etc.

The main metal minerals is scheelite, then molybdenite, cassiterite, rare pyrite, chalcopyrite, limonite, arsenopyrite etc; non-metallic minerals are feldspar, quartz, rare biotite, tourmaline, epidote, zircon, chlorite, muscovite, sericite etc.

2.5 Wall rock alteration

According to the influence of magmatic hydrothermal

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and tectonic control, alteration of rocks in the region is extremely strong, and alteration types consist of silicide, angular rock, sericite-pyrite in petrochemical, chemical, Kira, green mud rock, altered-often overlap each other. Among these, silicified, Kira rocks of petrochemical, green slime, sericite have a closer relationship with tungsten mineralization.

3 Discussion of Genesis of Mineral Deposit

The Pingtan scheelite deposit occurs in the fracture zone of granitic batholiths in Miaoer Mountain, the orebody is controlled by structure (Ni et al., 2009). Tectonic fracture zone is both a tungsten mine ore-forming hydrothermal fluid migration pathway and ore-hosting space. According to former study, miaoershan rock (second part of the Silurian granite, ore-bearing rock) zircon SHRIMP U-PB (Beijing Center of ion microprobe) age is 443.5 ± 8.1 million years, which belongs to late Caledonian. Moreover, K_2O-Na_2O of Silurian granite rock illustrated considers being in high-k Calc-alkaline series peraluminous Granites, and characteristics of the alkali-rich and peraluminous granite is a hornblende-rich source of deep penetration deep-typical characteristics of granite, Silurian granite may result from partial melting of the lower crust. From Sinian to early Silurian, Hunan province and its neighboring areas are in sedimentary phases of marine strata, mid-late Silurian, there have been massive and strong in the Caledonian movement and igneous activity in this region. In this way, requent granite magma brought a lot of W, Sn, Mo and other minerals. According to the geological observation: parts of the ore-

bearing lode in granite have been experienced metamorphism, deformation, and the hydrotherm caused by migmatite activation and regional metamorphism in favour of migration of tungsten and local enrichment of tungsten. Pingtan scheelite deposit is controlled by the North-North East fracture, output as a pulse of ore, unclear and surrounding rock boundaries, transition. Ore body structure surrounding rock are mostly preserved, ore body and surrounding rock occurring sericite, petrochemical, silica, carbonates of Green Clay, Kira rocks, sand and toxic, high-temperature minerals such as pyrite occur. No acidic minerals such as fluorite is found within the mine area found, indicating scheelite calcium in the rock body might not from a rock mass, but many times granite resulting from sedimentation in alkaline environment conditions.

In summary, this scheelite deposit is a medium-high temperature hydrothermal filling metasomatic deposit which has a very close relationship with magmatic rocks in fault broken zone.

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