

HOU Dianji, XIAO Chunhui, LIU Hao, WANG Chan, WANG Chun, FENG Hanbin and XU Wei, 2014. Rare Metal Deposit Prospecting Prediction in Xianghualing of Hunan Province. *Acta Geologica Sinica* (English Edition), 88(supp. 2): 1244-1245.

Rare Metal Deposit Prospecting Prediction in Xianghualing of Hunan Province

HOU Dianji¹, XIAO Chunhui¹, LIU Hao¹, WANG Chan², WANG Chun^{1,3},
FENG Hanbin¹ and XU Wei^{1,4}

1 College of Earth Science, Chengdu University of Technology, Chengdu 610059, China

2 College of Earth Science, Guilin University of Technology, Guilin 541004, China

3 Sichuan Provincial of Geology and mineral Bureau prospecting team, Chengdu 610059, China

4 Sichuan Provincial of 101 geological team, Chengdu 610059, China

1 Introduction

Hunan Province is known as the hometown of China's nonferrous metals. Xianghualing ore field is one of them, with mineral complex up to more than 20 ore deposits (points), and the ore-forming elements within ore fields are multiple. The magma activity in the ore fields was frequent and intense, giving priority to with acidic intrusive rocks, which belong to shallow source remelting magmatic rocks. All kinds of low-T pneumatolite-hydrothermal type of rare polymetallic mineralization and tectonic movement, magmatic activity and certain stratigraphic are closely related. This formed Is given priority to with Sn, Pb, Zn polymetallic deposit, there are mainly cassiterite sulfide type and Pb-Zn-sulfide type, followed by altered rock type and quartz vein type and skarn type. Most ore bodies are output by secondary layered and lenticular or vein, tubular, mainly occurs in the side of the stock and the rock concave fault zone, or in interlayer fracture zone and structural fractures. The author based on the research of the predecessors' materials and concluded that, Xianghualing ore fields with the "source, thermal environment, ore-controlling structure" of the trinity of metallogenic geological environment.

2 The Analysis of Metallogenic Geologic Environment

Ore-forming materials were multiple sources, trace element testing results show that in the rock mass and the surrounding rock of Cambrian system and Devonian

system, the abundance of ore-forming elements was high. Compared with the Vickers, in the rock mass, Sn is 40-80 times higher, Pb is 7-8 times higher, Zn is 2-4 times higher, W is 70-100 times higher; the content of W, Sn, Pb and Zn in the surrounding rock, not only higher than the Vickers, but also higher than the ore field regional background value. Therefore, the ore-forming materials of this area are derived from magmatic hydrothermal, also are derived from ore-bearing surrounding rock.

Steady heat flow environment, in the ore fields, homologous multi-stage magmatic activities, formed by magma chamber as the center of steady heat flow environment. In this environment, on the one hand, to fully metasomatism, on the other hand, the ore-bearing hydrothermal activation and transfer of ore-forming elements in the stratum, and in the appropriate structure space enrichment and mineralization.

Ore-guided and ore-contained structure, the different forms of structure in this area plays a direct control effect to the size, shape, spatial distribution and a variety of the migration enrichment of ore-forming elements of the rock mass and the ore body. The NW-trending basement faults provides the magma rising channel, lotus shape vortex structure on the control of the batholith top interface fluctuation and mineral distribution, fault fracture zone, interlayer fracture zone and tectonic fractures provided the condition for the ore-contained.

3 Three-level Metallogenic Prediction System and its Discriminant Marks

The author thinks that we can build a Xianghualing ore field loop three-level metallogenic prediction system, it

* Corresponding author. E-mail: 292221312@qq.com

embodies the ore-bearing magmatic hydrothermal and surrounding rock in the thermal environment three-level enrichment mineralization controlled by the structure of tertiary. Level I is ore magma domal structure; level II is lotus shape vortex ore-controlling structure; level III is mineralization target positioning.

3.1 The discriminant marks of ore magma domal structure

① In the side of the domal structure, there is large gravity gradient belt get through, which can reflect the deep fracture. Inside the vault, likely appear the secondary gravity gradient zone, which reflect the magma passage;

② Inside the domal structure, gravity and magnetic area has a display of concealed batholith positioning lower abnormal and circinate satellite images;

③ strata in the vault, ore-forming elements abundance is higher, geochemical anomalies into planar distribution;

④ Top of the buried batholith, high-level-emplaced of ore-bearing stock development, mark combination clear.

3.2 The discriminant marks of lotus shape vortex of ore-controlling structure

① Pillars marker combination clear;

② More groups of arc distribution of arc column shows a clear indications of local gravity anomaly and magnetic

anomaly

③ Satellite images arc mark clear;

④ On the arc of ore-controlling fracture, geochemical abnormal high value discontinuous distribution.

3.3 The discriminant marks of mineralization target positioning

① Arc local anomaly zone distribution of geophysical exploration, geochemical exploration and NW-trending gravity gradient belt intersection, namely the lotus shape vortex structure arc fault and NW-trending intersection part of the basement faults;

② Gravity porphyritic - ring local anomalies of inner ring and outer ring, which controlled by the arc fault rock concave belt;

③ In fracture or rock concave belt, where gravity, magnetic, geochemical, induced electrical anomaly co-occurrence location.

The author considers that loop three-level metallogenic prediction system for the complex-control type of tin polymetallic deposit metallogenic prediction, provides modern surface geological, geophysical and geochemical distinguishing marks, and for the Xianghualing ore field regional prospecting prediction provides a more detailed way, also for similar polymetallic deposit prospecting provides reference basis.