Fluid Inclusion Study of Fankou Pb-Zn Ore Deposit, Fankou, Guangdong, China*

LU HUANZHANG (卢焕章)
(Institute of Geochemistry, Academia Sinica)

Abstract

The Fankou Pb-Zn ore deposit occurs in Devonian and Carboniferous carbonate rocks. This deposit was thought to be a hydrothermal ore deposit related to a granite, but the present research suggests it is a stratabound, stratiform mineral deposit.

As a result of geological studies, primary sedimentary and later replacement features were found. Part of some ore bodies are concordant with the host rocks, but most are discordant lenses and veins in the carbonate rocks. Thus there are two types of ores, primary sedimentary and later replacement. The replacement type is very common. Isotopic studies indicate that most of the Pb and S are of sedimentary origin, but part of Pb is of radioactive origin, possibly introduced during later replacement. A regional geochemical survey indicates that the Pb and Zn contents of the Fankou region are respectively 1.5 and 3 times higher than the world average. Only a few one-phase liquid fluid inclusions were found in the primary sedimentary type. Gas-liquid fluid inclusions were found in the replacement type ore but not in the primary sedimentary type. The fluid which replaced the primary sedimentary rocks had temperatures of 100—200°C, with a salinity of 3—6 wt. % NaCl equiv. Under the action of such fluid the original sedimentary rocks were replaced to form the present ore deposit.

Introduction

The Fankou Pb-Zn ore deposit is located in the northern part of Guangdong Province, China (Fig. 1). It is one of the largest Pb-Zn ore deposits in China. In this paper the environment of formation of this ore deposit is discussed based on geological and fluid inclusion studies.

* The author was a visiting scholar both in the University of Pennsylvania, Department of Geology, and the U. S. Geological Survey, U. S. A. when the paper was prepared.
Geological Characteristics of Fankou Pb-Zn Ore Deposit

General statement

The Fankou Pb-Zn ore deposit occurs in the South China Platform. The deposit was discovered in 1958 and all previous geological work by a geological team is of a proprietary nature and has been never published. The deposit has some similarity with some stratiform ore deposits in China. Professor Tu Kuang-chih (涂光炽) (1979) made a geological survey of Fankou. Lai Yingqian (赖应笺) (1979) published a review on all types of Pb-Zn ore deposits in Guangdong Province, including the Fankou deposit.

The main ore-bearing strata of Fankou are: Devonian D7 sandstone and “warty” limestone (0—90 m); D7c limestone and dolomitic limestone (78 m); D7b limestone and “warty” limestone (75 m); D7a limestone rich in corals, algae, stromatolites, and oölites (150 m); D7 sandstone, shale, dolomite, limestone (135 m); and Carboniferous: C1dc sandstone and shale; C1 limestone (10—17 m).

A granite body is located more than 10 km to the north, but no genetic relationship has yet been found between the ore body and the granite. Structurally, the Fankou ore deposit is located in the northwestern part of a synclinorium whose axis trends northwest and dips southeast. These folds were broken by one set of faults with a dominant NNE trend and a secondary set trending NNW and NE. Faults F3 and F4 of the NNE system are

![Geological section of the Fankou ore deposit](Fig. 2. Geological section of the Fankou ore deposit. 1. Quaternary; 2. D7, limestone, rich in coral, algae, stromatolites; 3. D7b, limestone and warty limestone; 4. D7c, limestone and dolomitic limestone; 5. D7, sandstone, shale and marl; 6. Carboniferous limestone and sandstone; 7. ore bodies: black—Pb-Zn ore body; dotted—pyrite ore body.)