CO_2 degassing of Cretaceous basic magma: an important role for gold mineralization in the Jiaodong Peninsula, China

LI HONGYAN[1], WANG DONG[1], WANG TIANQI[1, 2]

[1] Institute of Mineral Resources, Chinese Academy of Geological Sciences, Beijing 100037, China, e-mail: lihongyan@cags.ac.cn or hylicags @126.com

[2] Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China

A large amount of evidences show that lithospheric mantle in the eastern part of the North China Craton experienced carbonatitic melt metasomatism, and the strongest metasomatism region is consistent with the Jiaodong Peninsula in space. The Jiaodong Peninsula is defined as the largest gold metallogenic province in China and the third largest gold producing area in the world. The Laizhou-Zhaoyuan metallogenic belt (LZMB), which contains 90% of the gold deposits in the Jiaodong Peninsula, is characterized by the development of a large number of NE-trending basic-acid dikes, which are deduced to be closely related to the metallogenesis.

Here we explore the role of CO_2 in lamprophyre magma evolution and gold ore-forming fluid activity with information from the microstructure, major elements，isotope and dating for lamprophyre and gold ore.

The existence of spheroids and amygdala carbonates in the basic lamprophyres in LZMB indicates the occurrence of liquid immiscibility of silicate-carbonate, as well as CO_2 degassing during magmatic evolution.

Fluid inclusion studies of gold ores in LZMB show that the ore-forming fluid is rich in volatile components, such as CO_2, and there exists decompression boiling in the metallogenic process. The existence of ellipsoidal, droplet pyrite and chalcopyrite in ore indicates that some mineral elements in the decompression boiling process of ore-forming fluid could be transported by bubbles.

Therefore, the CO_2 degassing of these early Cretaceous basic magma derived from metasomatized mantle played an important role in gold mineralization in Jiaodong Peninsula

*This study is supported by the fund from the Ministry of Science and Technology of People's Republic of China (2016YFC0600105) and the National Natural Science Foundation of China (41673058, 4152098 and 41272090).