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Study on the Metallogenic Chronology of the Gold Deposits in Jiaoliao Area

MEN Yekai, WANG Ende, YOU Xinwei, ZHANG Jianmin and CHEN Huijun

School of Resources and Civil Engineering, Northeastern University, Shenyang, Liaoning, 110819, China

Mineralization age determination is important in studying and discussing the genesis， metallogenic regularity and indicating prospecting direction of the deposit. The study of the metallogenic age of the Gold deposit in Jiao Liao area has a long history, many domestic and foreign scholars have conducted a lot of research and put forward different views, but some divergences still exist (Mao et al,2003; Yang, et al; Yao Fengliang, 1990; etc.). The early research thought that the metallogenic epoch and genesis of gold deposit in the area is concerned with the Precambrian metamorphic rocks, mainly emphasizes the contribution of Archean granite greenstone belt and Proterozoic volcano sedimentary rocks to the gold metallogenic, and formed two main understanding, the Archean metallogeny theory(Guo Wenkui, 1951) and Proterozoic metallogenic theory(Yu Hanmao 1987).With the research of the different causes of magmatite intrusion and gold mine in the time-space relationship went through and The Mesozoic Large-scale diagenetic mineralization events was acknowledged , most researchers agree that the gold mineralization and tectonic magmatic time had close relationship, they poimt out two main points of view, the Yanshan stage mineralization theory(Guo Wenkui, 1951b) and Mesozoic hydrothermal superimposition metallogenic theory(Wang Henian, 1984) .

Until twentieth Century 90 years, with the deeper work of the metallogenic theory and the maturity of isotopic dating technology , the study of the mineralization age of gold deposits in Liaoning area become a hot topic once again . Many domestic and foreign geologists introduced the latest and most accurate dating methods into the study of regional gold mine age, got a large number of accurate test data and worked out a lot of new knowledge, and greatly promoted the development of regional gold mineralization theory. We collected mainly isotopic dating research data of gold deposit of Jiaoliao area in recent years, and analysed the age of gold mineralization in Jiao Liao area by combining the geological characteristics with ore deposit types .

The age of large-scale metallogenic of The gold deposit of Jiao Liao peninsula area is in focus , mainly distributed in the70~260Ma in the Mesozoic and reached the peak value at about 120Ma, shows the characteristics of concentrated outbreak type mineralization in Early term. The mineralization age of Jiaodong Peninsula distributed between 80~190Ma, the charateristic of periodic mineralization is not obvious, the ore-forming age value focused on 110~130Ma. Only some veins in a few gold deposit did not belong to the metallogenic interval age values, such as Zhang Zhenhai (1994) got 188.9 ± 4.2Ma mineralization age in Lingshan Gou Gold Deposit, Lv Guxian (1992) got 71.86 ± 9.6Ma age values by using the Rb-Sr method in sericite of altered rocks in Jiuqu gold deposit. These data indicate that large-scale metallogenic of the gold deposits in the Jiaodong area occurred in Early Cretaceous , Jurassic and Cretaceous also developed part of the deposit (ore), but the overall mineralization is weak and the deposit (orebody) were smaller.Mineralization age value of gold deposits in Liaodong peninsula area distributed widely. Yu Steel (2005)obtained 2316 ± 140Ma by the application of Re-Os isochron dating in the arsenopyrite of gold bearing minerals in Maoling gold deposit , it was the oldest gold metallogenic age in area. The youngest mineralization age 92.1Ma , was obtained in WANGJIAWAIZI gold deposit by Hao Ruixia (1991) . Mineralization has obviously multiple periods, in except the Mesozoic large scale mineralization , a small amount of metallogenic age value also obtained in Proterozoic.It shows that Liaohe Group suffered greenschist facies metamorphismis affected by tectonic deformation in the early Proterozoic, that caused preliminary enrichment and activation of gold in formation and formed the raw ore body of low grade in formation(Chen Guoda, 1982). The main ore-forming age value focused on 90~260Ma, belonged to the Indo-Chinese to yanshanian, showing that the period of the gold deposits in Liaodong area was the major ore-forming period.

Gold deposit formed in different mineralization also

* Corresponding author. E-mail: sdgmkeke@126.com

exists certain differences in different mineralization ages. The Majiayao gold deposit As the representative of the later Metamorphic hydrothermal superimposition deposit ,the metallogenic age was 106~137Ma (Zhai, etal, 2002; Zhai Jianping, 1998). Magmatic hydrothermal alteration to ,The Guo Cheng and Pengjiakuang as the representative of Magmatic hydrothermal altered rock type gold deposit,the metallogenic age was mainly focused on 115~120Ma (Zhang Lianchang, 2002).The Linglong, Jiaojia, Wulong as the representative of same magma hydrothermal type gold deposit ,the large-scale metallogenic age value mainly focused on 90~140Ma (Li et al, 2003; Lu Jing, 2012; Yang et al, 2001; Wei Junhao,2001). The metallogenic ages of the three types of gold deposit was early Cretaceous, and the three types of gold deposit had close relationship to the rock mass of Guojialing ,Sanguliu and the intermediate basic dikes widely developed in the mining area, they had very close metallogenetic ages,and should be product of the same tectonic - magmatic activity . The type of Metamorphic hydrothermal and magmatic hydrothermal superimposition gold deposit hosted in the the early Proterozoic metamorphic rocks, controlled by the double mineralization of the action in Paleoproterozoic metamorphic and the Mesozoic superimposition , but the large-scale mineralization of gold occurs in the 150~230Ma, the Mesozoic superimposition was the main mineralization,such as the gold deposit of Baiyun,Maoling, Xiaotongjiapuzi. The main mineralization ages of different gold deposit is slightly different, the main mineralization of Baiyun gold deposit occurred in the 196~209Ma (Liu Guoping, 2000), the main gold mineralization of Xiaotongjiapuzi occurred in the 233~239Ma (Xue Chunji, 2003),the main gold mineralization of Maoling occurred in the 245Ma (Ren Zhongyuan, 1990). The differences in different mineralization ages of different types of gold deposit of Jiao Liao area reflect the different main metallogenesis in metallogenic period of the area, suggested that the differences between geodynamics background of gold Metallogenic in different ages.

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