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Metallogenic Regularity of Hydrothermal Uranium Deposits in the Migmatite of the Kangdian Axis

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1 Introduction

The Kangdian axis is an important polymetallic metallogenic belt in Southwest China, and it is also an area with a lot of hydrothermal uranium mineralization(Wang Hongjun, et al.,2009. The basic characteristics and metallogenic regularity of hydrothermal uranium deposit in Kangdian axis are as follow: the migmatization, which is formed by deep magma penetration and associated with early ductile shearing , caused a preliminary enrichment of uranium, and formed very low grade uranium mineralization; tectonic-hydrothermal fliuds superimposition formed a high grade uranium ;the destructive effects of lately tectonic activity and crust uplift were significant.

2 Metallogenic Characteristics of Hydrothermal Uranium Deposits

The type of uranium mineralization is rich, but it is the most important in the ancient crystalline basement mixed granite and metamorphic hydrothermal uranium deposit. In addition, the uranium mineralization is also found in the iron oxide copper gold deposit.

The ore-forming temperature is high, the REE, Nb, Ta, Mo, P and other elements are enriched. The principal uranium mineral in the migmatite type uranium deposits is uraninit.

The ore body is small in scale and poor in continuity, but high in grade.

3 The Metallogenic Age of Hydrothermal Uranium Deposits

The mineralization of hydrothermal uranium deposits has several periods in the Kangdian axis. Uranium deposits metallogenic epoch have been divided into 5 stages. On the whole, the metallogenic age gradually become newer and newer from south to north .The metallogenic epoch of No.1101 uranium ore in the southernmost Monding is about 1052Ma; then the age of No.505 uranium ore in Panzhihua Datian times is 770Ma; age of Miyi Haita uranium mineralization is mainly 340~225Ma; the No.7301 uranium mineralization in Mianning was formed 30-40Ma. The zoning of the plane is consistent with the tectonic magmatic evolution of the Kangdian axis.

4 Ore Controlling Factors of Hydrothermal Uranium Deposits

The spatial distribution of uranium mineralization is controlled by migmatite that related to ductile shear zones. Uranium deposits in Kangdian axis occur in Proterozoic basement, such as No.1101 in Yunnan Mouding,, No.505 in Panzhihua Datian, Miyi Haita , are associated with the migmatization. Uranium ore bodies mainly occur in migmatization metamorphic rocks and banded migmatite and migmatitic granite, a zonal distribution migmatite controlled by the ductile shear zone or related with ductile shear zone. The felsic veins are densely distributed and layered rock, clear boundaries, to cross into the main. This kind of felsic veins mainly occurs in the process of ductile shear zone, and the magma produced by the deep melting is penetrated into the shear zone. In the late stage of the evolution of the magma, a small amount of pegmatite may be formed due to the increase of the volatile gas. In this process, the uranium is continuously activated and enriched to form the rich uranium mixed rock, which can form the enrichment and mineralization

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of uranium. The study of the coupling relationship between the large scale ductile shear deformation and the mineralization is of great significance to the uranium metallogenic prognosis and prospecting direction.

The uranium mineralization is controlled by the superposition of multiple structures and hydrothermal fluids. The distribution of the North-South structure is the most important structural style in Kangdian area. The North-South tectonic belt is the most extensive, the largest scale, the most intense activity and the longest history of evolution. This tectonic pattern is a manifestation of multiple tectonic superimposition since late Archean, which plays an important role in controlling mineralization. Yunnan Monding 1101, Panzhihua Datian 505, Miyi Haita area, a north-south distribution of uranium metallogenic belt, controlled by nearly NS trending ductile shear zone. It is found that the ductile shear zone near the north and South has the characteristics of multi period superposition. Early tectonic controlled the formation of migmatization, the late ductile shear zone superimposed on the early mixed rock belt, forming mylonite and schistosity belt, later period tectonic fluid again superimposed on the earlier structure, eventually forming industrial orebody. The ore body mainly occurs in the secondary faults of the main structure. This is the reason that the uranium mineralization in Kangdian is nearly north-south. Therefore, the study of the ore controlling regularity is the key to the breakthrough of the prospecting in the area.

Due to the complex geological evolution history and strong tectonic movement, the early formation of uranium ore bodies has been severely deformed, damaged, broken, offset and so on. For example, the uranium ore body in Panzhihua Datian was crushed and broken down by the earlier structure, and then it was cut off by the latter phase. In addition, the large-scale uplift of the new generation of the earth's crust in the Kangdian can also cause the destruction of uranium ore bodies, such as erosion, oxidative leaching. Therefore, it is very important to study the preservation condition of ore body.

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