

Granite-related hypothermal uranium mineralization in South China

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As one of the important geological types, granite-related uranium deposits account for about 29% of the total discovered natural uranium resources in China. Most of the granite-related uranium deposits located in Taoshan-Zhuguang uranium metallogenic belt, South China. In addition to the typical pitchblende vein-type uranium mineralization of epithermal metallogenic system, a new type of granite-related uranium mineralization with characteristics of hypothermal metallogenic system was discovered in South China by current studies. However, hypothermal is a contrast term to epithermal mineralization, it's not the conventional intrusive high temperature mineralization. Hypothermal uranium mineralization is presented by disseminated uraninite or pitchblende stockwork in fissuration granites normally with extensive alkaline alteration. The high temperature mineral assemblage of uraninite associate with scheelite and tourmaline was identified in hypothermal uranium mineralization. Fluid inclusion studies on this type mineralization indicated the middle to high temperature ($> 250^{\circ}\text{C}$) mineralization with the mixing evidence of ore forming solution derived from deep level, and the boiling and mixing of ore forming solution are regarded as the dominate mineralization mechanism for the precipitating of uranium. In contrast to the mineralization ages of 67Ma to 87Ma for typical pitchblende vein type mineralization of epithermal metallogenic system, the mineralization age is older than 100Ma for hypothermal uranium mineralization in granite. Such as the Shituling deposit in Xiazhuang uranium ore field, uraninite and pitchblende micro veins with extensive potassic alteration, chloritization and sericitization are hosted in fissuration Indo-Chinese epoch granites with the uranium mineralization age of 130Ma to 138Ma and the mineralization temperature of 290°C to 330°C . More and more examples sharing the similar characters of hypothermal uranium mineralization have been recognized in Taoshan, Xiazhuang and Nanxuiang areas, South China. Preliminary geodynamic studies reveal that hypothermal uranium mineralization in granite priority occurred in the areas with lithospheric extension in crust thickening geological setting. This new type of uranium mineralization in granite is now considered as the new target for future exploration.

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