Mineralization mechanism and geodynamic setting of No.337 uranium deposit, South China

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Xiazhuang uranium ore-field was one of the most important granite-type uranium deposits in China. No.337 deposit has been taken as a representative of the earliest (138Ma), relatively high temperature (300°C) and short time gap between the formation of host-granite (142Ma of Rb-Sr isochrone) and the mineralization in Xiazhuang uranium ore-field since late 1980's.

But latest study revealed that the formation age of the Maofeng pluton, the most important host granite of this deposit, is 238.2~206Ma by LA-ICP-MS zircon dating, while the secondary muscovite in Maofeng pluto yields the age of 131–136Ma by $^{40}Ar/^{39}Ar$ dating which corresponding to the main mineralization age of 130.3–138Ma in No.337 deposit. Further study undeveloped that in Guidong granitic complex Maofeng pluto shown some distinct characteristics. It has the Al_2O_3/TiO_2 ratio that infered the lowest forming temperature. It has the lowest ∑REE and was the only pluto which presents typical tetrad effects of REE in Guidong granitic complex. It is also shown a varying $\delta^{18}O$ values and the lowest $(^{87}Sr/^{86}Sr)_i$ values. The above founding on dating and geochemical characteristics revealed that Maofeng pluto had been underwent an intensive alteration during the stage of 130~140Ma.

Combining this new finding with the geodynamic setting of this area, a concept model of uranium mineralization and geodynamic setting for No.337 uranium deposit might be presented: in late or post-collision stage of Indosinian Orogeny, strongly peraluminous granite of Maofeng pluto formed from partial melting of uranium rich formations. Intrusion of mafic in late Yanshanian Period (<140 Ma) caused large fluid movement. Uranium was reactivated and extracted from the altered granite, and then precipitated in some favorite places to form uranium ore bodies. No.337 uranium deposit was a typical represent of the first stage uranium mineralization in Xiazhuang uranium orefield.

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Inapplicability of TEX_{86} index as temperature proxy in stratified lakes

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The application of TEX_{86} index to reconstruct paleotemperature from lake sediments has so far been limited to a few large lakes using an ocean sediment-derived paleotemperature equation. The applicability of the index to sediments in small lakes remains a question. We have collected surface sediments from a variety of lakes extending from the Arctic to southern Patagonia; no clear linear regression between TEX_{86} and mean annual temperature could be established. The large annual temperature range in mid to high latitude lakes distinguishes them from typical ocean conditions. We studied the GDGTs-based index distribution in the water column in a stratified lake in Lofoten region, NW Norway. We measured the physical parameters of the lake (temperature, salinity, pH, etc) and filtered water at different depths to determine how the modern distributions of GDGTs and TEX_{86} indices correspond to conditions in the water column. Results indicate that TEX_{86} indices and temperatures in the water column *in situ* are not correlated. The oxycline started above the thermocline but their bases are the same depth. The abundance of the isoprenoid GDGTs starts to increase rapidly at the beginning of the oxycline rather than the thermocline, and reaches the maximum (30 times more abundant than at the surface) at the base of the oxycline. Isoprenoid GDGTs then have similar abundance in the anoxic zone as at the top of the oxycline, indicating that methanogenic archaea rather than thermophilic archaea made the most significant contribution to isoprenoid GDGTs in the sediments of this stratified lake. The TEX86 indices are higher in the oxycline and anoxic zone than in the surface. The stream water in the catchment also carries the suite of GDGTs in the TEX86 equation. The peat in the lake catchment also contains some of the isoprenoid GDGTs, further complicating the signal of TEX86 in the sediment.