

Discussing the metallogenic conditions of sandstone uranium ore at pull-apart tectonic setting

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Tectonic Setting Analysis

After the basalt macroelement analysis results were handled graphically with TAS [1, 2], K₂O-SiO₂ [3] and AMF graph [1], the all graph spots locate at shoshonite zone, so it could be taken the conclusion that the Baiyinggebi basin is a pull-apart tectonic setting during Cretaceous period.

Depositional System Analysis

After the field investigation and drill hole data analysis, there are alluvial fan deposit, pebbly braided river deposit, braided deltaic deposit, alluvial deltaic deposit and lake deposit in Baiyinggebi basin.

Uranium Metallogenic Conditions

According to sandstone uranium metallogenic conditions, the braided deltaic deposit has the characters of stratiform, permeability, connectivity in Baiyinggebi Cretaceous sedimentational basin, and its sand-body contained rich in organic element such as carbon dust, plant fragments, low coal seam and pyrite reducing matters. There are full of rocks with abundant uranium source at the basin provenance. So, there are better uranium metallogenic conditions.

Uranium Metallogenic Prediction

Analyzed basin structural setting, sedimentary facies distribution and drill hole geologic data, the sandstone uranium ore forecasted could be find among braided deltaic sand-body in Tamusu district of Baiyinggebi basin.

Discussion

The sedimentation of basin is mainly rapid-accumulation at pull-apart tectonic setting, and it could be taken as the target stratum of uranium ore that the braided delta sand-body has the uranium metallogenic conditions.

[1] Irvine T. N. Barager W. R. A. (1971) *Canadian Journal Earth Science* **8**, 523–548. [2] Le Bas M J. (1986) *Journal of Petrology* **27**, 745–750. [3] Miller C, Schuster R, Klotzli U et al (1999) *Journal of Petrology*, **40** : 1399-1424.

Early episodic crust growth of North China Craton: Inferred from U/Pb age, Hf and O isotopes of detrital zircons from Proterozoic sediments, Jixian Section

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To clarify the pattern and rates of continental crust growth in North China Craton (NCC), the clastic sediment samples have been collected for each stratigraphic unit of Neo-Mid Proterozoic Jixian section, which covers over 1.0 Ga sedimentation history (0.8 Ga to 1.8 Ga) in northern margin of NCC. 554 detrital zircons have been separated for analysis of U-Pb age, Hf and O isotopical compositions. The U-Pb age spectrum show two major groups around 2.3-2.5 Ga and 1.6-2.3 Ga, with a minor peak at 3.0-3.3 Ga. It is also characterized by lack of zircons younger than 1.5 Ga while the youngest sedimentary record dated as 0.8 Ga. The two-stage Hf model ages constitute a continuous spectrum from 2.6 Ga to 4.4 Ga, with major peaks at 2.8 Ga - 3.3 Ga and 3.9 Ga. This is consistent with that the majority of zircons show mantle-like values as $\epsilon_{\text{Hf}}(t) > -8$ and $\delta^{18}\text{O} < 6.5$, especially for those older than 2.7 Ga. The above observations would support an early episodic crust growth in the region studied. Previous study on sediment Nd isotopes for the same section has indicated a Proterozoic crust growth event at ca. 1.7 Ga (Zhou and Goldstein, 1990) and mixing between juvenile and recycled crustal components may cause an oscillation feature of the crust evolution. Based on zircon U-Pb dating, Hf and O isotopic compositions, the generation rates of continental crust have been estimated. It has been suggested that up to 80% and 95% of the present crustal volume was formed by 2.5 Ga and 1.0 Ga, respectively, in the region studied. This work would provide a case study for comparison between sediment - Nd isotope approach and detrital zircon - multiple isotope approach. The preliminary results have demonstrated that the former would manifest the coeval crust growth history while the later would reveal the early history of crust formation for a given region.

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