

Geochemical characteristics of the Shihongtan uranium deposit in Turpan-Hami basin, West China

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Setting of Geology and Geochemistry

The Shihongtan uranium deposit in Turpan-Hami basin in Western China is an interlayer oxidized zone-type deposit, which occurs in the sandstone body in the Middle Jurassic formation. The basic mineral compositions are pitchblende, pyrite, quartz, calcite and chlorite. The analytical results of mineral components correlative with uranium were shown in the Table 1 [1, 2].

sub zones	Ra/U	Th/U	C _{org} /%	Fe ₂ O ₃ /FeO
oxidized	4.03	2.34	0.05	1.25
oxdox	0.54	0.03	0.28	0.32
reduction	1.15	1.76	0.33	0.52

Table 1: Analytical data of typical geochemical parameters in the deposit.

Discussion of Results

The ore-hosting sandstone body in the deposit was divided into three subzones, namely, oxidized zone, oxdox zone and reduction zone according to the results from table above. Observably, there are high ratios of Th/U, Ra/U and Fe₂O₃/FeO but low organic carbon content in the oxidized zone. Contrarily, the oxdox zone was noted for low Th/U, Ra/U ratios and high organic carbon content. However, the ratios of Fe₂O₃/FeO, Ra/U and Th/U are low but organic carbon content is high in the reduction zone. So, the geochemical characteristics imply condition that mineralization of uranium occurs in the oxidized zone.

[1] Wu Bo-lin *et al.* (2005) *Mineral Deposit*, **24**, 34-43.

[2] Zhang Zimin *et al.* (2004) *World Nuclear Geoscience* **21**, 5-8.

Moissanite-bearing carbonatite xenoliths from Cenozoic basalt, North China: Products of ancient oceanic crust subduction?

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The origin of igneous carbonatites has been extensively debated. Direct melting of a carbonate-bearing mantle source [1], immiscible liquids [2] or extensive crystal fractionation from a CO₂-rich silicate magma [4] have been suggested to interpret the petrogenesis of carbonatites.

Moissanite-, olivine-, orthopyroxene- and clinopyroxene-bearing carbonatite xenoliths coexisting with spinel lherzolite and pyroxenite xenoliths were found in the Cenozoic basalt, North China. Their geochemistry is inconsistent with anyone of the above hypotheses. They are characterized by Si-enrichment (SiO₂ > 20wt%). Both Si-enrichments and variably REE patterns could have resulted from carbonatite liquid-peridotite reaction, as suggested by mantle mineral xenocrysts. δ¹³C (-6.4 to -8.5‰) and δ¹⁸O (30.3 to 30.9‰) fall in the field of marine sediments, which implies that these carbonatite xenoliths may have an oceanic crust origin. Zircon inclusion was found in moissanite, excluding the possibility of artificial contamination (Fig. 1). These observations suggest that these carbonatite xenoliths may represent fragments or carbonatite liquids of the Paleo-Asian oceanic crust that subducted beneath the North China craton. Moissanite was formed as metamorphic product of reduced, carbonaceous sediments during deep subduction, as suggested by Mathez *et al.* [3].

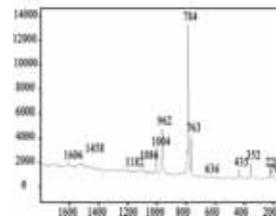


Figure 1: Raman spectra of zircon inclusion in moissanite.

[1] Harmer, R.E., (1999) *J. Petrology* **40**, 525-548. [2] Lee, W.J. *et al.* (1997) *J. Petrology* **38**, 1113-1135. [3] Mathez, E.A. *et al.* 1995. *GCA*, **59**(4) 781-791. [4] Verhulst, A. *et al.* 2000. *Lithos* **51**, 1-25.