

Uranium occurrence of Barun Uranium Deposit in Erlian Basin, Inner Mongolia

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The Barun sandstone type uranium deposit in Erlian Basin, Inner Mongolia is a valley channel type low grade uranium deposit with an average uranium grade of 0.0137%, which will be soon built into a small leaching mine, belong to Bayanwula Uranium Mine. The α track, the electron probe (EPMA-1720) and field emission scanning electron microscopy (FESEM) were used to study uranium minerals in core samples because the mineral type and occurrence of uranium ore have great influence on the leaching rate of uranium in situ leaching mining.

The ore-bearing strata of Barun uranium ore body are sandstone and gravel sandstone of upper layer of Saihan Formation of Lower Cretaceous (K_1s^2), and the ore body is buried 90-115m below the surface. The research results show that the uranium minerals of Barun uranium deposit are mainly distributed in ultra-microscopic size, and two types of uranium minerals including crystalline and amorphous, are observed. Uranium minerals are fusiform (needle-like), long columnar, cubic columnar (short columnar), and amorphous membranes, which filled in the dissolution cavity or attached to the mineral surface corroded such as feldspar, quartz and pyrite and clay mineral. Most of the size of fusiform uranium minerals are less than $1\mu m$ in length and about $0.2\mu m$ in diameter, and the lengths of long and cubic columnar uranium minerals are smaller (Fig.1 b). A large number of dispersed ultramicroscopic uranium minerals and condensed film uranium minerals were found in an area of $250\mu m \times 600\mu m$ (Fig.1). Some uranium minerals distributed in clay minerals and cements. Combined with the light microscope observation and electron probe test data (Table 1), the uranium minerals are mainly pitchblende and uranite, but the contents of phosphorus (P_2O_5) and calcium (CaO) are relatively higher. Because uranium mineral particles with fusiform shape are too small to extract mineral particles, accurate determination of uranium mineral still needs further study.

This research was supported by the National Natural Science Foundation of China (U2067204).

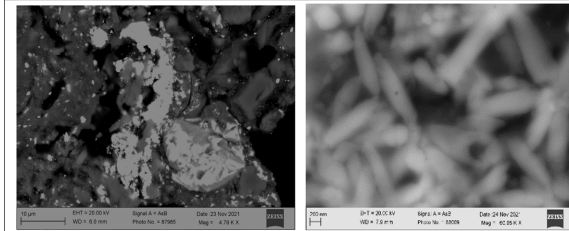


Fig.1 Uranium mineral in Barun Uranium Deposit

Table 1 EPMA data of uranium minerals in core samples of Barun uranium deposit.

Code	Na2O	MgO	Al2O3	SiO2	P2O5	SO3	K2O	CaO	FeO	MnO	FeO	NiO	ZnO	La2O3	Ce2O3	ThO2	UO2	Σ.01
17-544-1-2	/	0.95	0.74	7.66	15.21	3.10	/	4.18	1.05	0.08	1.51	0.05	/	0.53	1.06	/	53.47	93.64
17-544-1-3	0.33	0.77	1.32	7.67	14.46	3.35	/	7.64	1.10	/	0.18	0.19	0.59	1.33	1.17	/	57.07	96.77
17-544-1-4	/	0.50	1.22	7.84	14.77	3.34	/	8.57	0.38	0.20	1.14	0.05	0.03	0.30	0.07	0.28	56.96	95.45
17-544-1-5	0.02	0.39	1.46	7.28	14.27	2.70	/	8.33	0.12	0.00	1.33	0.22	0.72	/	/	0.24	56.96	94.04
17-544-1-6	0.14	0.65	3.45	10.01	12.42	1.37	/	8.12	0.43	0.06	1.69	/	/	/	/	/	44.09	82.23
17-544-1-7	/	0.55	1.10	7.33	14.71	3.32	/	8.25	0.10	0.25	0.93	0.30	1.21	/	0.64	0.03	56.66	95.18
17-544-1-8	/	0.52	0.84	7.65	14.37	3.22	/	8.52	0.06	/	0.93	0.36	/	/	/	/	55.38	91.85
17-544-1-9	0.39	0.46	3.89	16.27	12.27	1.90	0.50	6.66	0.26	/	1.74	/	/	/	/	0.17	41.03	85.54
17-502-2-052	2.78	0.42	4.22	20.53	11.34	0.39	1.84	6.59	0.08	1.16	1.24	0.11	/	1.98	1.98	1.88	42.93	99.27
17-502-2-052-2	0.63	0.35	3.61	16.36	13.23	0.62	1.02	6.72	0.37	/	0.60	0.65	0.60	/	/	0.60	43.26	88.58