

SOUTH KAZAKHSTAN DIAMONDS

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ESE carries out exploration for gem diamond deposits in Southern Kazakhstan beginning in 1990. All diamond-bearing objects known till now have been investigated and all the information about diamond presence within them had been checked thoroughly. So now the diamondiferousness of the Chu-Ili and Sarykamys prospects is proved absolutely.

Chu-Ili diamond occurrence is located at 44°50'-45°N and 72°-73°E. In 1949-1953 N.P.Mikhailov et al had discovered within Cenozoic fluvial sediments 2 crystal fragments and 3 diamond crystals as octahedra up to 0.821 carat colorless transparent, of gem quality. ESE had delineated the diamondiferous sediments on the total area of 250km². Now recovered diamonds are of different character, they are colorless, greenish-yellow, yellow-green, grey-green; transparent and opaque; luminescent and non-luminous; gems and industrial; octahedra and cubes, cuboids and skeletal, intergrown forms. Dominant quantity of diamonds are small, not more than 0.12 carat. Diamonds of the same character had been recovered from the basaltoid dyke, covered with the Cenozoic loose sediments. The dyke was explored at the total length of 27km from NW to SE. Its width varies from 0.1km up to 1.0km dipping 70°-85° to SW. Age of the dyke may be not more ancient than Famennian. The dyke is composed with basalts (>80%), picrites, picrobasalts, andesitebasalts, breccia of that rocks with carbonat cement and eruptive breccias. The last ones are located usually at the salvages of the dyke. Basaltoids are of massive or brecciated texture, amygdaloidal, plagioporphyritic; groundmass is of hialophylitic, pilotaxitic, intersertal and microdiabase texture, where plagioclase, titan-augite, orthopyroxene, olivine, biotite-phlogopite and apatite have been determined. These basaltoids are subalkaline, potassic-sodium and sodium, with xenolites of hosting terrigenous rocks and inclusions of intensely chloritized, serpentinized, talcose and phlogopitized aggregate. LaN:SmN:YbN ratio varies from 32:20:13 to 120:41:12. Diamondiferous basalts are enriched with LREE. The samples with diamonds contain also garnet, graphite, chrome spinels, zircon, moissanite and ilmenite.

Sarykamys prospect (diamond occurrence) at 49°05'N, 70°58'E is represented by a system of alnoite dykes and eruptive breccia pipes. Alnoite is phlogopite-olivine-monticellite porphyritic amygdaledaloidal potassium micromelilitolite. Alnoite and its breccia

had been intruded into the sandstones, conglomerates and alevrolites of Middle and Upper Devonian age on the area 2.8(SW-NE)e0.53 (SE-NW)km². The dykes are subvertical of SW-NE strike, rarely of SE-NW strike forming left-hand en-echelon rows. Some bodies are of length from first metres up to 700m. They are usually zonal, central part being built with alnoite of 0.2-7.0 m width, whereas the salvages consist of alnoite eruptive breccia, passing into the brecciated hornfelsed host rocks. The pipes are related usually to the conjunctions of the dykes, and their diameter does not exceed 60m. Alnoite contains megacrysts ($d < 5\text{cm}$) of phlogopite, augite, enstatite, olivine, chrome spinel and garnet; nodules ($d < 5\text{cm}$) of chrome spinel peridotite, micaceous clinopyroxenite, glimmerite and host rock xenolites ($d < 3\text{m}$). Alnoite crystallisation had been accomplished near 308 ± 3 mln years ago, regarding the incline of Rb - Sr isochrone, at $(87\text{Sr}/86\text{Sr})_0 = 0.70596$ and $\text{LaN}:\text{SmN}:\text{YbN} = 204:35:5$. Eruptive breccia contains different diamonds. That of 0.3-0.4 mm size are colorless transparent, chipped off, whereas diamonds of 0.5-0.7mm are presented with greenish-yellow transparent octahedra, having smooth even planes. Samples with diamonds bear also such minerals as garnet, chrome spinel, chrome diopside, moissanite, ilmenite, zircon and graphite.

Diamondiferous magmatic bodies are coincided to the Zhalaïr-Nayman zone of SE-NW strike, being the right-hand strike-slip under the stress of pure shear. Basaltoids are located within the right-hand slips of SE-NW strike, but alnoites are related to the left-hand slips which are "S"-like transverse.

The geodynamical interpretation of the matter-structural complexes of the Eastern Betpakdala make it possible to state, that:

- 1) Archean-Lower Proterozoan lithospheric roots of the Central Kazakhstan microcontinent were stabilized during Proterozoan-Palaeozoan time;
- 2) geodynamical regime of the active continental margin was dominant during Upper Devonian - Middle Carboniferous;
- 3) at the same time subduction was diagonal, with left-hand dislocation;
- 4) diamondiferous magmatites had been generated at the transitional zone between the volcano-plutonic belt and the back arc basin. Geodynamical situation and the material composition of the diamond-bearing magmatites indicate, that they may be regarded as products of mixing the barren paternal melts with the diamondiferous kimberlite and/or lamproite melts, generated during the ascending of the mantle diapir at the back arc space. So zone of the transition from the volcano-plutonic belt to the back arc basin may be the most perspective for diamond exploration.

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