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### Pipe Karashoho and its petrographic composition

**MAP  
OF DIAMONDFEROUS AREAS  
IN UZBEKISTAN**

Legend:

- Areas of diamondiferous volcanics:  
I - Kokkak; II - Karashaho
- Areas of prospecting for diamonds:  
III - Amsamak; IV - Madgurm;  
V - Tuzun; VI - Kahlid;  
VII - Kuptang; VIII - Uga-Darja;  
IX - Sangardak
- Diamonds in alluvial deposits

### Tectonic position

**Схема  
геологического строения  
диатремы Карашаха**

**Масштаб**  
0 5 10 20 30 м

**Условные обозначения**

- Четвертичные отложения
- Спелскалиты, спелевые спелскалиты, спелевые конгломераты-спелскалиты
- Спелевые керсаниты, спелевые минералиты, пероксидная минерита, сульфиды
- Граниты, гранодиориты, трапповые
- Диориты, диоритовые порфириты, сикито-диориты, сикито-диоритовые порфириты, сикиты
- Флюидно-карбонатационные брекчия, сланы
- Брекчия II генерация
- Брекчия I генерация
- Лагерзиты порфировые
- 1 Лагерзиты мелкокристальные пероксидные, сланцы пероксидные спелевые  
2 Крупнокристаллы поликристаллические микрокритические
- Кристаллическая (VII - V) Пероксидная кремневая, слюдистая опанца, известняки и доломиты
- Контуры пород: А - дисперсион, В - предполагаемые в лагирзитах
- Контакты мелкокристаллических обособлений в лагирзитах
- Тектонические нарушения
- Зоны мелометизации
- Линия геологического разреза

The pipe has a complex structure. It is composed of two adjacent stock-like bodies of massive lamproites surrounded by zones of volcanic breccias, also lamproitic in composition; each represents a separate phase of intrusion. The composition of the lamproites varies from melanocratic olivine- to pyroxene-lamproites to leucocratic orenditic rocks rich in

orthoclase and sanidine. Numerous xenoliths, in volcanic breccias, are represented by peridotites, pyroxenites, rodingites, and others including micaceous garnet peridotites and some exotic fragments as chrome-diopside + chromite + garnet + moissanite + diamond aggregate.

Olivine in lamproites is magnesian (80-93 % Fo), with an admixture of Ca (0.09-0.5 % CaO), Ni (up to 0.4 % NiO) and Cr (0.02-0.35 % Cr<sub>2</sub>O<sub>3</sub>). Phlogopite is highly magnesian ( $mg = 0.88 - 0.92$ ) and contains up to 1.33 wt.% BaO.

Among accessory minerals in lamproites and lamproitic breccias, barite, apatite, zircon, rutile, disthen, andalusite, corundum, moissanite, ilmenite, staurolite, sillimanite, perovskite, garnet, chrome spinel and chrome-diopside were identified. Chrome spinel forms octahedra which may be deformed and rounded, 0.2-1 mm in size, with Cr<sub>2</sub>O<sub>3</sub> from 53.4 – 63.4 wt.%. Among garnets, grossular-andradites and almandine-pyropes were identified. Ilmenite is low-magnesian (usually 0.27-0.68; rarely up to 4.5 wt.% MgO). Moissanite contains up to 1.06 wt.% Cr<sub>2</sub>O<sub>3</sub>.

Chemically the Karashoho lamproites stay close to jumillites and orendites.

The Karashoho lamproites contain an epigenetic gold mineralization with a grade of 0.75-2.85 g/ton (in some zones up to 4.7 g/ton) which forms indicated resources as several tons of gold.

### Diamonds

Among more than 200 studied diamonds from the Karashoho pipe, octahedra (including macles) strongly predominate (Fig. 3); most (69 %) are colorless and transparent. Many of the diamonds bear mineral inclusions (silicates, chromite, rutile, graphite, and possibly sulphide).

Both the total nitrogen content (360-1900 ppm) and the nitrogen aggregation ratio in the Karashoho diamonds (%B = 10-67 %) vary widely. This possibly indicates the existence of several diamond populations in the lamproites.

The carbon isotopic composition of the Karashoho diamonds also varies widely from -7.3 ‰ to -13.8 ‰

PDB; this also points to the existence of different diamond associations: peridotitic and eclogitic.

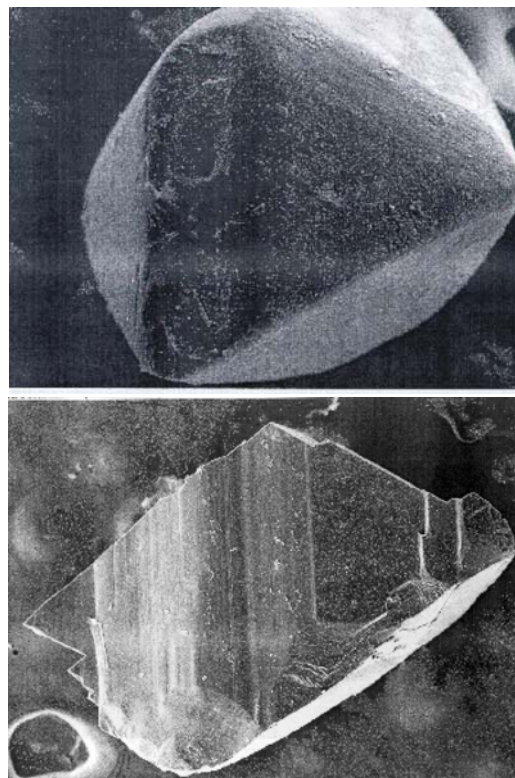


Fig. 3. Diamonds from the Karashoho pipe.

### Conclusions

The Karashoho locality is an example of a non-kimberlitic, off-craton diamond deposit. It is located within the Hercynian Tyan-Shan Fold System which has an ancient, Archean basement and, possibly, a thick, mature lithospheric root. Early-Carboniferous lamproites contain diamonds which, judging by their properties, have a long thermal history. The diamonds are likely to be of different populations, and may have been formed at different stages of magmatic evolution.

The Karashoho-type diamond deposits may be found in other regions, and can explain the existence of placer diamond deposits in some off-cratonic areas, such as Kalimantan, Tasmania, New South Wales, and others.