



## **The diamondiferous xenoliths from kimberlites of Yakutia: a key for the diamonds origin**

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More than 400 diamondiferous xenoliths have been discovered in the kimberlite pipes of Yakutia. Diamond-bearing specimens are encountered among ultramafic xenoliths predominantly dunite harzburgites and in all types of eclogitic rocks: bimineral eclogites, kyanite and corundum eclogites and also in garnet-websterites.

The diamonds in xenoliths are found mainly as separate crystals but in some xenoliths the amount of diamonds may be as high as 1000. The distribution of crystals in the specimens is irregular and does not coincide with the specimen surfaces. The sizes of the crystals vary from fraction of millimeter to 10 millimeters. The diamonds from xenoliths are correlated with the diamonds from kimberlites by their morphology and physical properties. Mineral inclusions are rare in the xenolith diamonds. Careful examination of more than 300 diamonds from about 100 xenoliths shows that 40% of macrodiamonds (size > 1mm) contain some visible inclusions. In most cases these are a little tiny opaque grain. Microprobe data suggest that overwhelming majority of them are sulfides. Silicate inclusions of garnet, clinopyroxene and very seldom rutile or others are rare. The diamonds in some specimens have sulfide rims around them. A number of facts show that in the process of diamonds growth the sulfide melt was present together with the silicate melt. The mechanism of diamond growth should be discussed in a complex sulfide-silicate system enriched in fluids.

The diamondiferous eclogites do not stand out of the general series of mantle eclogites from kimberlite pipes either by specific properties and minerals composition, or major and trace elements distribution between coexisting garnets and clinopyroxenes. Intensive partial melting is characteristic feature for most of the specimens. To some extent this is a typomorphic sign of diamondiferous eclogites. A selective enrichment pattern REE is observed in some xenolith minerals (high content of LREE in clinopyroxene and enhanced HREE in garnet).

In proposed topic will be summarized data on diamondiferous xenoliths from the Udachnaya, Nyurbinskaya and other pipes of Yakutia. These results comprise in the whole about 300 samples and include data on major and trace element chemistry of xenolith minerals with attention to the morphology and distribution of diamonds in separate xenoliths. Special attention will be given to variation of physical properties of diamonds that were measured in 500 diamonds recovered from new parcel of 30 xenoliths. These properties include total content of nitrogen, co-variations in B1 and B2 defects and hydrogen. It should be pointed that there exist a rather strong correlation between morphology and some physical properties of diamonds. Special remarks will be given to the evidence of possible metasomatic origin of diamonds in some xenoliths.