



## **Regularities of spatial association of major endogenous uranium deposits and kimberlitic dykes in the uranium ore regions of the Ukrainian Shield**

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During exploration works we discovered the spatial association and proximity time formation of kimberlite dykes (ages are 1,815 and 1,900 Ga for phlogopite) and major industrial uranium deposits in carbonate-sodium metasomatites (age of the main uranium ore of an albititic formation is 1,85-1,70 Ga according to U-Pb method) in Kirovogradsky, Krivorozhsky and Alekseevsko-Lysogorskiy uranium ore regions of the Ukrainian Shield (UkrSh) [1]. In kimberlites of Kirovogradsky ore region uranium content reaches 18-20 g/t. Carbon dioxide is a major component in the formation of hydrothermal uranium deposits and the formation of the sodium in the process of generating the spectrum of alkaline ultrabasic magmas in the range from picritic to kimberlite and this is the connection between these disparate geochemical processes. For industrial uranium deposits in carbonate-sodium metasomatites of the Kirovogradsky and Krivorozhsky uranium ore regions are characteristic of uranyl carbonate introduction of uranium, which causes correlation between CO<sub>2</sub> content and U in range of "poor – ordinary - rich" uranium ore. In productive areas of uranium-ore fields of the Kirovogradsky ore region for phlogopite-carbonate veinlets of uranium ore albitites deep  $\delta^{13}\text{C}$  values (from -7.9 to -6.9‰) are characteristic. Isotope-geochemical investigation of albitites from Novokonstantynovskoe, Dokuchaevskoe, Partyzanskoe uranium deposits allowed obtaining direct evidence of the involvement of mantle material during formation of uranium albitites in Kirovogradsky ore region [2].

Petrological characteristics of kimberlites from uranium ore regions of the UkrSh (presence of nodules of dunite and harzburgite garnet in kimberlites, diamonds of peridotite paragenesis, chemical composition of indicator minerals of kimberlite, in particular Gruzskoy areas pyropes (Cr<sub>2</sub>O<sub>3</sub> = 6,1-7,1%, MgO = 19,33-20,01%, CaO = 4,14-4,38 %, the content of knorringite component of most grains > 50mol%), chromites (Cr<sub>2</sub>O<sub>3</sub> = 45,32-62,17%, MgO = 7,3-12,5%) allow us to estimate the depth of generation of kimberlite magmas more than 170-200 km. Ilmenites show two groups according to MgO, Cr<sub>2</sub>O<sub>3</sub> and TiO<sub>2</sub> content. Reconstructions of the mantle sections show also two intervals of pressures divided at 4.5 GPa, the upper part is highly metasomatized This high degree metasomatism is determined for almost all mantle columns. It is suggested that large-scale of uranium-bearing mantle fluids may be associated with the ancient degasation during the subduction which is highly enriched in U component .

Analysis of the reasons for the marked association kimberlitic dykes and major industrial uranium deposits in carbonate-sodium metasomatic in the UkrSh led to the conclusion that hydrothermal uranium deposits are confined to the supply mantle fluid systems of mantle fault zones exercising brings sodium carbonate solutions enriched uranium from mantle sources.

References:

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