C-isotopes of diamonds in eclogites from the Nyurbinskaya pipe, Yakutia: Evidence for metasomatic origin

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22 diamond plates from 18 eclogite xenoliths of Nyurbinskaya pipe have been analysed (by SIMS) for C isotope composition and some plates were mapping (by FTIR) for N and H distribution. Inner structure of diamonds was revealed by CL. The $\delta^{13}C$ profiles almost for all investigated diamonds are cross the plates from one site of rims to the opposite site of the crystals. Most samples have displayed an interrupted multistage growth with distinctive cores, intermediate and rim zones. In some crystals the cores show evidence for dissolution and intermediate growth zones are separated from the cores by zones with oscillatory growth. The diamonds have a wide range in **$\delta^{13}C$** from -15.2‰ up to 9.0‰ (± 0.4‰), and 30–1140 at. ppm in nitrogen contents.

The changes in $\Delta^{13}C$=2–3‰ occur across the contacts between distinct zones. It is possible to state that carbon isotope ratios within the crystals cores usually exhibit low variation in $\Delta^{13}C$=1–2‰ and only in rare cases enhanced up to 3.3‰. $\delta^{13}C$ values are usually lower in the intermediate zones and lowering towards the rims up to 3‰ $\Delta^{13}C$.

High spatial resolution SIMS profiles establish that growth zones are primary with no evidence of diffusive relaxation. The markedly different CL, N and H concentrations and nitrogen aggregation states between major growth zones demonstrate that the eclogitic diamonds of Nurbinskaya pipe grew during multiple and interrupted growth events, probably from fluids enriched in K and H.

Wide variations and anomalously high $\delta^{13}C$ values in eclogitic diamonds combined with abundance of high $\delta^{18}O$ values of garnet are evidence for crustal protolith of eclogites and/or indications for the multiple evolution of the mantle beneath the Nakynsky field that could be the result of intense metasomatic events in SCLM of the Siberian Platform.