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## The Namuaiv picrite-melanephelinite pipe, Kola alkaline province, Russia: petrography and evolution of late alkaline melts during forming large alkaline province with carbonatites.

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Petrological investigations of large alkaline provinces with carbonatites are very important to understanding the generation and evolution of alkaline melts, as well as processes provided generation of related ore deposits. Most often, generation of large alkaline massifs with carbonatites accompanied by intrusion of related ultramafic alkaline and related alkaline-ultramafic melts as dykes swarms and explosive pipes. These melts could be generated on the initial stages of magmatic activities of alkaline province magmatism, or fix the final stages of alkaline magmatism, after the formation of large alkaline massifs with carbonatites. Studying of these melts could provide insights into the composition of primary melts for large alkaline province, as well as understanding their evolution during magmatic activities. Moreover, the latest melts forming dykes and explosive pipes could provide information about the evolution of the mantle source of these rocks including of processes of lithospheric mantle transformations (enrichment, depleting, mantle metasomatism etc.).

The Kola alkaline province (KAP) with carbonatites is a good natural laboratory for investigation petrology of alkaline melts and their evolutions. KAP includes large alkaline massifs with carbonatites, the early dyke swarms of ultramafic and alkaline lamprophyres and late explosive pipes of the alkaline rocks (Arzamastsev et al., 2005). To investigate the composition of alkaline melts at the late stages of the province's magmatic activity, we have studied the petrography and mineralogy (olivine composition) of the Namuaiv pipe rocks.

The Namuaiv pipe ( $363 \pm 3$  Ma; Arzamastsev et al., 2005) erupted the alkaline rocks of the north part Khibiny massif ( $377 \pm 3$  Ma). The detailed petrographical studied suggested, that the pipe breccia was formed during mixing of two portions of alkaline melts close in composition to alkaline picrite and melanephelinite.

The Namuaiv rocks contain several types of olivine grains: (1) picritic melt phenocrysts; (2) antecrysts of ultramafic lamprophyres of the Kandalaksha Bay (Vozniak et al., 2023) that traced the first stages of the province magmatism; and (3) disintegrated fragments of the lithospheric mantle

peridotites (mantle xenocrysts). The composition of olivine phenocrysts suggests that in the final stage of KAP activity, the alkaline melts have not fractionated in deep magmatic chambers and their composition is close to primary melts. That is in contrast to the first stages of KAP magmatism, where lamprophyre dikes were formed as fractionated melts (Vozniak et al., 2023). The presence of the olivine antecrysts assumes that the Namuaiv melts ascent through magmatic channels modified by previous portions of alkaline melts, that consistent with the presence of metasomatic clinopyroxene-phlogopite xenoliths within the pipe.

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