

COMPOSITION AND LOCALIZATION FEATURES OF LAMPROITES-LIKE ROCKS IN THE IRKUTSK PRISAYANYE AREA

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A new type of deep-seated magmatites has been revealed which are presently considered as the possible recharging source for diamond-bearing placers in the mid channel of Biryssa river. In Upper Riphean deposits they form dyke- and sill-like intrusive sheets from tens of metres to 1 km in length and 1-4 m thick. Contacts of bodies with enclosing rocks are sharp, melted in, with zones of chilling and hornfels formation. In the overlying sffata of the platform mantle they are represented by tuff diatremes of the subisometric form from 70 to 300 m across. Contacts of tuff with enclosing rocks are sharp with small apophysises and satellite veins.

The discussed formations are related to high-potassic, moderately alkaline, saturated or weakly undersaturated by silicic acid high-alumina basic rocks with slightly higher magnesium content. Moreover they are characterized by equally high content of uncoherent and refractory elements which makes them different from chemically close basaltoides. According to petro- and geochemical properties, they are intermediate between lamprophyres and lamproites being closer to the latter. This fact along with their uncommon mineralogical properties make it possible to assign them to lamproites-like rocks.

The mineral composition of rocks is defined by various quantitative relations of olivine clinopyroxene, sanidine, phlogopite-biotite and other minerals contained in minor amounts: chrome-spinelides, ilmenites, titanomagnetite, magnetite, amphiboles, orthopyroxene, garnets, magnesian and zinc spineles, rutile, sphene, tourmaline, gubnerite, lorenzenite and native iron, zinc and copper.

Olivine both in phenocrysts and microlites in their groundmass are totally pseudomorphically substituted by serpentinite and talc. Rare relicts of olivine have 10-12% Fa. Clinopyroxenes vary in a wide range in chemistry. They are presented by chrome-diopsides, subcalcic chromous augites, subcalcic salites, fassaites which form phenocrysts and small prismatic segregations in a groundmass; later aegirines form small acicular crystals in vein isolations. Chrome-diopsides are characterized by very low contents of Al_2O_3 and TiO_2 (0.1-0.3% and 0-0.1% correspondingly) with higher contents of Cr_2O_3 (to 1.3%) and Na_2O (to 1%) and ferruginity varying in the range from 10 to 12%. Augites (to 6% Al_2O_3) have ferruginity close to that of chrome-diopsides and highest contents of Cr_2O_3 (to 1.7%) among investigated clinopyroxenes. Salites are distinguished from diopsides and augites by higher ferruginity (35-38%) and a titanium content (to 1% TiO_2), in the near total absence of chrome. Fassaites contain to 7.5% Al_2O_3 and to 1% Cr_2O_3 .

Micas in the lamproites-like rocks are related to phlogopites (20% MgO), magnesian (10-13% MgO) and ferruginous (5-6% MgO) biotites. They are characterized by moderate to high contents TiO_2 (to 4.5%). Most magnesian varieties have a higher Cr_2O_3 content (to 0.5%). Magnesian biotites are significantly enriched in barium (to 5% BaO).

Garnets form 4 groups in composition: pyropes and almandines, andradites, grossulars, spessartines. Chrome-containing piropes (about 70% Pyr and to 3% Cr_2O_3) are related to a hercynitic paragenesis and pyrope-almandines (30-40% Pyr) to the eclogitic one. In some cases andradites contain to 8% TiO_2 . In a group of grossulars of particular interest are the emerald-green chrome-grossulars (to 5% Cr_2O_3) and chrome-manganese grossulars (to 6% Cr_2O_3 and 17% MnO). They can be typomorphic for given rocks and used in their prospecting due to their rarity in nature. Spessartines contained to 32% MnO are characterized by wide variations of other oxides (to 30% grossular minal, 24% pyrop minal and 30% almandine minal).

Chrome-shpinelides which quantitatively dominated ore minerals form a continuous series from alumochrome-magnesian chrome-shpinelides, subferri-alumochromites, subferrichrome-picotites to ferruginous subalumochrome-magnetites and titanoferrichromites. Ilmenites contain above 4% MnO and to 0.2% Cr_2O_3 .

Minerals of the lamproites-like rocks are present in the composition of the heavy fraction diamond-bearing alluvium of the Birusa river and its tributaries. The comparative analysis of minerals of diamond-bearing lamproites from the region and lamproites-like rocks together with petro- and geochemical properties of the latter point to a deep-seated level of their generation and a potential diamond content.

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