CHEMICO-GENETIC CLASSIFICATION OF THE MOST IMPORTANT MINERALS-SATELLITES OF THE DIAMOND.

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Typomorhic peculiarities of the chemical composition and physical properties of the main minerals-satellites of the diamond (garnet, clinopyroxene, orthopyroxene, chrome spinellide, ilmenite, rutile) are of great importance during the searching for the diamond deposits (kimberlites, lamproites and others) and estimation of their productivity. These minerals occur in the kimberlites as megacrystals, inclusions in diamond and in the diamond bearing peridotites and eclogites. A lot of works, including genelizing ones (Sobolev, 1974; Gurney, Moore,1989; Garanin et al, 1990) are devoted to the application of the indirect mineralogical criteria during the estimation of the kimberlite diamond bearing. Chemico-genetical classifications of the diamond minerals-satellites represent the basis for the improvement of the known criteria of diamond bearing and for the development of the new ones.

The data banks and chemico-genetic classification of the most important minerals from all the inclusions in the diamond and from the aggregations with it,from the diamond bearing and nondiamond bearing xenolithes, peridotites, and eclogites as well as from megacrystals from the kimberlite rocks. The created data bank is based on more than 4000 electron-probe analyses of both original minerals and the ones borrowed from numerous literature sources.

The software used during the work with data base on the chemistry of minerals-satellites of the diamond includes statistical methods (cluster analysis and others), which are applied during the creation of chemico-genetic classifications. The method of the discriminant analysis is used to compare newly input electron-probe analyses with ones which already in the data bank and to refer them to the corresponding chemico-genetic group according to the coefficients values of the graphed discriminant functions.

The software ensures the definition of the correlations of diamond bearing and nondiamond bearing paragenesis in the analised samples of minerals with the graphing of linear (column) and circle diagrams. Besides the packet of the applied programmes has been developed to carry out traditional re-calculation of MS analyses (the calculatiom of minals, crystallochemical coefficients and indicator relation), graphreflection of analytical results (printing of diagrams and histograms) and statistical processing within the range of every one from the separated claster and chemico-genetic groups (calculation of average contents,root-mean-square deviation,carring out of the correlation analysis and so on.).

The software allows to evaluate the rocks productivity with the application of all known by now indirect mineralogical methods and to improve the latter in the future.

The developed chemico-genetic classifications of minerals-satellites are the basis for the usage of the automatised systems to obtain the objective information about the diamond bea-

ring of the tested object in the relation of minerals-satellites of diamond bearing and nondiamond bearing paragenesis , about the contribution of the rocks of ultra basic or eclogite paragenesis into the diamond bearing of the tested object.

References:

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