

Research of Nanostructurized X-ray Amorphous Minerals by AFM

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Among products of geological processes the noncrystal substances are distributed. Before among geomaterials the basic attention was given to research of crystal mineral substance and microdisperse mineral phases. Progress of methods of research has allowed to find out and considerably to expand last decade ideas about nanodisperse mineral phases. Their study causes interest due to active influence of nanoconstitution on properties, to detection of some new unique forms in mineral substances.

In our work an attempt of search characteristics of nanoconstitution of various noncrystal mineral substances will be undertaken. Among them simple substances (ex., fullerene shungite Karelia), oxides (ex., natural photonic crystals – opals), complex substances (ex., solid hydrocarbons). Nanoconstitution visualized on a fractures surface off by atomic force and electronic microscopies. The quantitative superstructural data were received by a combination of microscopic researches with diffractational and statistical-geometrical analysis of morphological features.

As a result of the carried out researches local and global characteristics of supermolecular structures, in particular, a degree of orderliness of a relative positioning of elements nanostructures have been established. The multilevel fullerene-like structure of shungite carbon was studied in detail. For the samples distinguished by genesis, rows of dependence nanostructures features from geological conditions of finding, PT-parameters of processes of formation have been constructed. Possible mechanisms of structurization of globules are analyzed on ideas about aggregation of colloidal particles.

Keywords: AFM-STM studies of minerals and glasses, amorphous materials characterization, nanostructures