X-ray Study of the Native Solid Hydrocarbons Transformation

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The subject of our investigation the native hydrocarbons (bitumens), which we defines as organic compounds with a primarily hydrocarbon basis. In the structural relation bitumens are characterized by the supermolecular organization with the sizes of elements from tens nanometers up to micron. The X-ray method opens new possible in the diagnostics of complex systems, using as numerical index a graphitization degree (Sg), which allows to diagnose as well as follow the dynamics and transformation mechanism of bitumens in the carbonization series: asphalt – asphaltite – kerite – anthraxolite – graphite.

The purpose of the research work is to study X-ray transformation of bitumens on the supermolecular level. The X-ray spectrum of bitumens of different transformation stages consist of two basic reflection 0.48 and 0.38 nm corresponding to the hydrocarbon polynaphtenic phase (N_f) and an amorphous graphite-like phase (G_f). The concentration of the latter increase with the growth of the catagenetic transformations degree. That is a final transformation product of natural bitumen is graphite. This testify to the single ransformation mechanism of natural bitumens. Thus, the X-ray methods allow to determine the genetic type of native organic substances and establish the catagenetic transformation level of the organic substances.

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