ILLITE-TOBELITE CLAY MINERALS IN LOWER CARBONIFEROUS SEDIMENTS OF ALTYNAI COAL DEPOSIT (EASTERN SLOPE OF URALS)

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Post-sedimentary alterations of organic and mineral matter were investigated in detail in Lower Carboniferous strata of Altynai coalfield in the Egorshino-Kamenskiy region located in the Ekaterinburg's district on the Eastern slope of Urals. The coal-bearing strata vary in thickness throughout the structure, being on average 500 m thick. It consists of coaly argillites, aleurolites, sandstones, shales and coal seams of paralic genesis with thickness varying from 0.2 m to 1.2 m.According vitrinite reflectance values (Ro=2.50-3.50%), the content of volatile components (Vdaf=5.60-5.80%), and carbon content (Cdaf=93.99-95.00%), the organic matter in the sedimentary sequence suggested the anthracites and high coal rank.The pelitic fractions from rocks and coals investigated petrographically and by X-ray analysis consist of kaolinite (80%) and illite-tobelite, with minor amounts of pyrophyllite and quarts.In all samples illite-tobelite have shown rational seria of basal reflections with d(001)=10.1-10.2 Å. The intensity of 001 reflection always was several times higher then those for 002, 003 and 005 reflections. Saturation of samples with organic liquids (glycol and glycerol) did not change peak positions of basal reflections.Heating the samples till 3500 C didn't change XRD patterns. However, from temperature of 3500 C up to 5500 C samples have demonstrated non rational seria of basal reflections. Moreover, in this temperature interval, the intensity of 001 reflections have gradually decreased in comparison with those of 002, 003 and 005 reflections.IR spectra of samples have shown stretching band at 1430 cm-1 . These data correspond to illite-tobelite structure, that is K and NH4 –bearing mica mineral.As we compare vitrinite reflectance values and the results of chemical and X-ray analysis of clay minerals with scales of palaeotemperatures we can see that paleotemperatures of coal-bearing strata were about 350-400OC.