MECHANOCHEMICAL TRANSFORMATION OF SHUNGITE IN THE DYNAMIC SLIP ZONE

Yu.A. Morozov, S.S. Bukalov, L.A. Leites

1 Schmidt Institute of Physics of the Earth, Russian Academy of Sciences, Moscow, Russia
2 A.N. Nesmeyanov Institute of Organoelement Compounds, Russian Academy of Sciences, Moscow, Russia

Abstract. Tectonic slickensides considered as an evidence of the seismogenic dynamic slip were analytically studied in the samples of Karelian shungites by two methods: X-ray spectrometry and Raman spectroscopy.

An essential alteration of the matrix composition was revealed in the slickenside zone accompanied by carrying out of easily soluble and rapidly destroyable minerals (quartz and feldspars). A significant increase in the carbon concentration was found herewith; during the slip, initial carbon was transformed into its more dense modification, glassy carbon. The temperature range for the reaction of transformation of initial carbon into glassy carbon was estimated as 1450–1650 °C. It could be conceded that this temperature was reached due to the frictional heating.

Experimental data obtained for the glassy carbon in this temperature range suggest a significant decrease in its mechanical properties, which creates conditions for mechanical instability in the fault zone and facilitated slip along it.

Keywords: shungite, slickenside, dynamic slip, mechanical instability.

References


