Thermal behaviour of organically modified clays

Plevová, Eva
2013

Thermal behaviour of organically modified clays

E. Plevová[1], L. Vaculíková[1], E. Vítámvásová[2], V. Valovičová[1], G. Simha Martynková[3]

1Institute of geonics, AS CR, v.v.i, Ostrava, Czech Republic

2Department of Chemistry, Faculty of Sciences, University of Ostrava, Czech Republic

3Centre of Nanotechnology, Technical University of Ostrava, Czech Republic

eva.plevova@ugn.cas.cz

The clay minerals were modified by two alkylammonium cations under sorption procedure. The X-ray powder diffraction and FT-IR spectroscopy were used to evaluate the intercalation process of organic cations into the clay structure. The organo-montmorillonites exhibited IR spectra giving evidence about sorption or intercalation of the alkylammonium cations. The enhancement of the basal spacing obtained by X-ray diffraction confirmed the intercalation process of cations into montmorillonite and vermiculite samples. Thermal behaviour of the modified clay minerals was investigated by simultaneous thermogravimetry and differential thermal analysis. The organically modified montmorillonites exhibited the higher values of temperatures related to the total melting. Also the temperatures of exotherm effects connected to recrystallization and transformation increased with the concentration of alkylammonium salts. The temperatures of dehydratation and dehydroxilation decreased with concentration of alkylammonium cations. Vermiculite samples showed generally reducing of their thermal stability.

Acknowledgement:
This work has been done in connection with project Institute of clean technologies for mining and utilization of raw materials for energy use, reg. no. CZ.1.05/2.1.00/03.0082 supported by Research and Development for Innovations Operational Programme financed by Structural Founds of Europe Union and from the means of state budget of the Czech Republic.

Keywords: clay minerals, alkylammonium cations, intercalation, thermal analysis