

BASIC CHARACTERISATION OF BENTONITE FROM LIESKOVEC, CENTRAL SLOVAKIA

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The aim of this work is the characterisation of mineralogical and chemical composition of bentonite from the Lieskovec deposit. Thirty samples (L1–L30) were systematically selected from various parts of the deposit and analysed by X-ray powder diffraction analysis (XRD), infrared spectroscopy (IR), Mössbauer spectroscopy (MS), chemical and thermal analyses to identify the minerals present and to characterise the chemical composition of smectites. Cation exchange capacity (CEC) values provided information on the negative layer charge. The water vapour-sorption data at different relative humidities and the effect of soda ash treatment on sedimentation volumes were measured.

XRD patterns show that the dominant mineral present in all samples is a dioctahedral smectite. The impurities include: kaolinite and quartz in all samples and orthoclase, muscovite, pyrite and calcite in some samples.

OH stretching vibrations near 3620 cm^{-1} , complex Si-O stretching band centered at 1035 cm^{-1} , AlAlOH bending vibrations at 913 cm^{-1} , AlFeOH bending vibrations at 875 cm^{-1} and Al-O-Si deformation band at 531 cm^{-1} in the IR spectra indicate that a Fe-montmorillonite is the dominant mineral in this bentonite. Typical vibrations of kaolinite (the

most intense band at 3690 cm^{-1}) and quartz (doublet at 800 and 780 cm^{-1}) confirm admixtures of these minerals in all the samples. Carbonates (band near 1440 cm^{-1}) were identified only in L22 and L24.

Preliminary results of MS show Fe(II) content below 5% of total Fe in bentonite and less than 10% of total Fe bound in Fe-oxohydroxides. This means that substantial amount of iron is bound in the layers of montmorillonite.

Sedimentation volumes for samples treated with soda ash are clearly higher than those obtained for untreated samples, however, they are lower than those obtained for soda activated Al-rich montmorillonite from Jelšovský Potok (Slovakia).

These experimental results confirm that bentonite from the Lieskovec deposit is a clay containing Fe-montmorillonite (> 40%), other minerals present may include different amounts of kaolinite, quartz, orthoclase, muscovite, pyrite, carbonates and/or Fe-oxohydroxides, depending on the sampling location in the deposit. The montmorillonite contains substantially more iron in comparison with montmorillonites from other Slovak deposits. Soda activation improves rheological properties of the material.

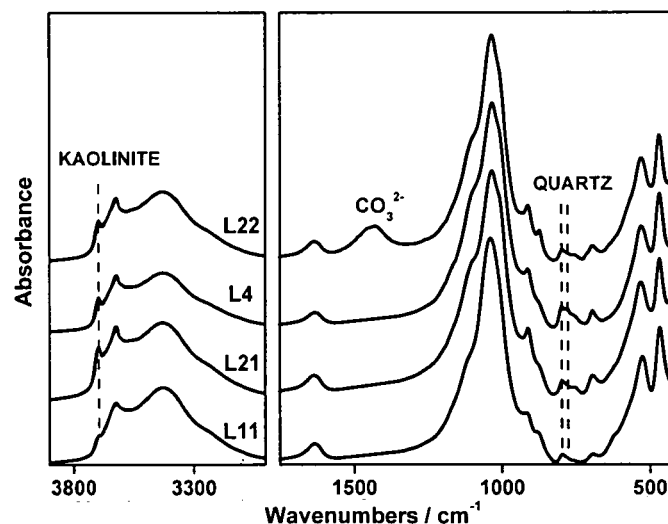


Fig. 1: IR spectra of less than $2\text{ }\mu\text{m}$ fractions of the samples L4, L11, L21 and L22