

## STRUCTURAL DESCRIPTION OF MODIFIED NATURAL ADSORBENTS

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### Abstract

The structural properties of prepared modified bentonite and bentonite - quartz sand mixtures have been studied. Microparticles of manganese oxide has been successfully precipitated on the surfaces of natural bentonite from deposit Jelšový potok (Slovakia), pretreated (natrified) bentonite and quartz sand from Šaštín - Stráže (Slovakia). The manganese oxide synthesis was carried out via a simple reaction between potassium permanganate (KMnO<sub>4</sub>) and hydrochloric acid (HCl). The changes associated with chemical modifications of natural materials have been observed. X-Ray diffraction analysis has identified amorphous patterns of birnessite type - manganese dioxide present as reference sample of synthesized manganese oxides as well as part of all natural modified adsorbents. Scanning electron microscopy has pointed on spherical particles of manganese oxide which were created by nanowalls connected to fine net and bonded to carriers. Manganese oxides heating to 500°C caused radical structural changes while the growth of extended cryptomelane crystals has been shown. The layered structural composition and very thin character of prepared birnessite type oxide either as reference sample or surrounding the particles of natural materials were likewise confirmed by transmission electron microscopy. FTIR spectroscopy contributes to structural description of prepared alternative adsorbents. The magnitude of the zeta potential has indicated stability of prepared powders in aqueous solutions.

**Keywords:** Birnessite type - manganese oxide, modification, bentonite

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