

Nanostructured surfaces

Synthesis of adsorbents with the remains of phosphonic acid based on the metasilicate

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The direct templating method to obtain mesoporous organosilicas SBA-15 type with phosphonic acid groups $\equiv\text{Si}(\text{CH}_2)_2\text{P}(\text{O})(\text{OH})_2$ was used. [1] It has been shown that increasing the concentration of complexing groups influences on the morphology and the spatial order of the porous structure of the samples.

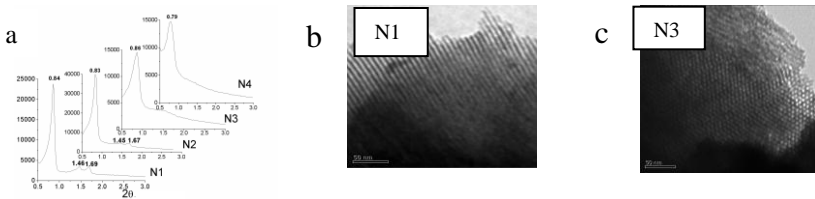


Fig.1. The XRD patterns (a) and images of the P-containing samples obtained by TEM (b, c).

The results of studying with X-ray and TEM (Fig.1) indicate the presence of a hexagonal structure for samples except N4 that indicate an influence of concentration of P-containing alkoxy silane on structure-formation.

It is found that one of the most key parameters that affect the structure formation processes is the ratio of the alkoxy silanes in the reaction mixture. The obtained materials are characterized by developed specific surface ($\sim 500 \text{ m}^2\text{g}^{-1}$) and relatively high value of the sorption volume ($\sim 0.8 \text{ cm}^3\text{g}^{-1}$), a narrow distribution of pores (7.2-8.1 nm). Based on these results it can be stated that the method of synthesis of N2 sample will be optimal in terms of the combination of high value of the structural parameters and the concentration of functional groups.

1. O. A. Dudarko et al. Microwave-assisted and conventional hydrothermal synthesis of ordered mesoporous silicas with P-containing functionalities // Coll & Surf - A: Physicochem. Eng. Aspects - 459 -2014. - P. 4-10.