

## NEW MESOPOROUS MATERIALS WITH SURFACE SUPRAMOLECULAR CENTRES FOR METHYL RED SORPTION

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**Abstract.** Macrocyclic units were introduced into the surface layer of mesoporous silica by sol-gel condensation of tetraethyl orthosilicate and  $\beta$ -cyclodextrin-containing silane in water-ammonium solution in the presence of a structure directing agent. Chemical and porous structure of parent and  $\beta$ -cyclodextrin-containing silica materials were elucidated by IR spectral and chemical analysis of surface functional groups, as well as nitrogen adsorption-desorption isotherms, X-ray diffraction, transmission electron microscopy and dynamic light scattering. It was found that the incorporation of cyclic oligosaccharide moieties into the hexagonally arranged mesoporous framework leads to the enhancement of sorption efficiency towards methyl red. Adsorption of dye from phosphate buffer solutions was studied as function of pH, contact time and methyl red concentration. Obtained results of equilibrium sorption were analyzed using Langmuir, Freundlich, Redlich-Peterson, Dubinin-Radushkevich and Brunauer-Emmet-Teller isotherm models.

**Keywords:** mesoporous silica,  $\beta$ -cyclodextrin, chemical immobilization, methyl red, sorption.

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