

SYNTHESIS OF SBA-15 TYPE ORGANOSILICA SORBENTS USING SODIUM METASILICATE AND PHOSPHONIC ACID RESIDUES

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Abstract. The direct template method was used for the synthesis of mesoporous organosilica sorbents of SBA-15 type with phosphonic acid groups using sodium metasilicate (SS) as a source of silica. The presence of functional groups in the synthesized samples was confirmed by IR spectroscopy and elemental analysis. It was demonstrated that the increasing concentration of phosphorous-containing groups influenced the morphology and the spatial order of the porous structure of the samples. However, ordered mesoporous conglomerates can be identified in the resulting materials even when the content of functionalized phosphorus-containing silane in the reaction mixture is 33%. This approach allowed producing relatively cheap materials with ordered structure, developed specific surface (550-700 m²/g) and high sorption volume (0.74-0.81 cm³/g). The optimal sodium metasilicate (SS):diphosphoethyltriethoxysilane (DPTS) ratio for the synthesis of SBA-15 type organosilicas with phosphonic acid residues was found to be 10:2.

Keywords: SBA-15, phosphonic group, organosilica, characterization.

Received: 05 May 2017/ Revised final: 07 November 2017/ Accepted: 13 November 2017