Preparation and characterization of novel Periodic Mesoporous Organosilicas (PMOs) for hydrogen storage

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ABSTRACT

In this work, templated hexagonal Periodic Mesoporous Organosilicas (PMOs) from bis-silylated organoprecursors were developed using the sol – gel method and the derived nanoporous materials, obtained by surfactant exchange using different ions in an ethanolic solution, were tested as hydrogen storage materials. The effect of *nanoporosity (surface area, pore size), aromaticity, unsaturated metal sites* and *point charges* were investigated using a combination of powder X-ray diffraction (XRD), thermal analysis (TGA/DTA), infrared spectroscopy (FT-IR), scanning electron microscope (SEM), surface area measurements (BET) and hydrogen uptake.

Hexagonal or amorphous nanoporous organosilicas were synthesized with specific areas up to 1000 m^2/g. The FTIR spectra and thermal analysis results revealed the presence of aromatic molecules in the walls of the hybrid systems while the hydrogen uptake measured at 77K and 80 bar found up to 3.2 % wt.

Keywords: *periodic mesoporous organosilicas (PMOs), nanoporous materials, hydrogen storage.*