308b Different Methods for Mesoporous Silica Synthesis and Their Effects on Surface Properties

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Mesoporous silicas have attracted considerable attention due to their various potential applications and recently there is an explosive growth in this research area. This study aims at synthesis of mesoporous silicas by two approaches and their characterization by performing porosimetry, X-ray diffraction and scanning electron microscopy (SEM). Mesoporous silicas have been synthesized at ambient temperature and at 120 °C using two different chemistries with cetyltrimethylammoniumchloride (CTAC) and cetyltrimethylammoniumbromide (CTABR) as templating surfactants. Following two different synthesis routes, the samples were washed, dried overnight and then calcined at 550 °C. These studies helped to investigate the effect of washing and calcination processes on the pore sizes, and hence the adsorption capacities of the samples. Nitrogen adsorption experiments were performed at 77K for the samples obtained on an ASAP 2010 volumetric adsorption analyzer to characterize the surface properties of the samples processed differently. Specific surface areas of the samples were investigated using BET and alpha-s methods. Pore size distribution functions of the silica samples were obtained by the BJH method. The study showed that nitrogen adsorption measurements are very useful for characterization of the surface and structural properties of the mesoporous silicas synthesized with different chemistries.