2° Simposio sobre Adsorción Adsorbentes y sus Aplicaciones

ISOSTERIC HEATS OF CARBON DIOXIDE ADSORPTION ON PRISTINE AND AMINE-FUNCTIONALIZED SBA-15 SILICA: AN EXPERIMENTAL STUDY

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ABSTRACT

This study investigates the adsorption of CO_2 on SBA-15 ordered mesoporous materials, for pristine and APTES *functionalized substrates. The structural parameters of the resultant adsorbents were obtained from the analysis of N_2 sorption isotherms at 76 K and from XRD and TEM studies. The adsorbent surface fractal dimension was calculated from the N_2 isotherms using both, the fractal isotherm equation derived from the Frenkel-Halsey-Hill theory and the Neimark equation based on thermodynamics. With both models, it was found that the surface roughness was nearly constant for both pristine and modified solids, despite a large reduction of the BET surface area and pore volume when APTES molecule was introduced. CO_2 adsorption on model SBA-15 substrates has been measured at temperatures in the range 263-303 K. Analysis of the isosteric heat of adsorption obtained from CO_2 adsorption isotherms revealed that this thermodynamic characteristic provides important information on the degree of change of the functionalized adsorbent material. Then, this quantity can be considered as a complementary guide for these investigations as well as for the characterization of the porous structure and its influence on the sorption behavior of SBA-15 amino modified materials.*

Keywords: Adsorption, isosteric heat, SBA-15, surface functionalization.