
Surface Area of Homoionic Illite and Montmorillonite Clay Minerals as Measured by the Sorption of Nitrogen and Carbon Dioxide

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Abstract: The surface areas obtained by application of the B.E.T. theory to adsorption isotherms of nitrogen and carbon dioxide gases at 77° K and 195° K respectively on homoionic samples of illite and montmorillonite clays have been examined. The isotherms were obtained using a standard volumetric adsorption system and the results are compared with those obtained by Thomas and Bohor (1968) using a dynamic sorption system.

Small amounts of residual water have been shown to have a marked influence on the accessibility of the internal surfaces of the montmorillonite clays to nitrogen and carbon dioxide adsorption, in this respect the standard outgassing procedure under high vacuum seems more efficient than that used in dynamic systems. The present data indicate that provided the sample has been satisfactorily outgassed there is little penetration of nitrogen or carbon dioxide gases into the quasi-crystalline regions of montmorillonite clays. With the exception of the caesium saturated montmorillonites the surfaces of the clays are more accessible to the smaller nitrogen molecules than to carbon dioxide assuming the values used for molecular area are correct.

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