
Selective Gas Adsorption by Amorphous Clay-Mineral Derivatives

Cristina Volzone¹, John G. Thompson², Alexandra Melnitchenko², José Ortega¹ and Stephen R. Palethorpe²

¹ Centro de Tecnología de Recursos Minerales y Cerámica (CETMIC), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Cno. Centenario y 506, CC 49 (1897) MB Gonnet, Buenos Aires, Argentina

² Research School of Chemistry, Australian National University, Canberra ACT 0200, Australia

Abstract: Amorphous derivatives prepared by aqueous reaction of various aluminosilicate clay minerals with concentrated KF solution at 80– 110° C were studied for their gas adsorption properties. The four clay minerals studied are halloysite, a well-crystallized kaolinite, a poorly crystallized kaolinite, and a montmorillonite. The gases tested are N₂, O₂, CH₄, CO, CO₂, and C₂H₂. The kaolin-group mineral derivatives are characterized by substantial reduction in particle size, high specific surface, and significant selectivity towards CO₂ and C₂H₂ relative to the other gases. The montmorillonite derivative shows no increase in adsorption over the starting material, however, for all the materials high adsorption of CO₂ and C₂H₂ was observed. Levels of gas adsorption and gas adsorption ratios are comparable to pillared clays.

Key Words: Amorphous Derivative • Gas Adsorption • Gas Separation • Halloysite • Kaolinite • Montmorillonite • Potassium Fluoride • CMS Source Clay SAz-1 • Specific Surface

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