
An Aluminum Pillared Montmorillonite with Fast Uptake of Strontium and Cesium from Aqueous Solutions

D. T. Karamanis¹, X. A. Aslanoglou¹, P. A. Assimakopoulos¹, N. H. Gangas¹, A. A. Pakou¹ and N. G. Papayannakos²

¹ Department of Physics, The University of Ioannina, 451 10 Ioannina, Greece

² Department of Chemical Engineering, National Technical University of Athens, Greece

Abstract: The uptake of Sr and Cs by 2 types of aluminum pillared layered clays (Al-PILC), a reference sample (AZA) and a specially tailored sample (FRAZA), were investigated. The AZA sample was prepared from air-dried precursors and the FRAZA sample from freeze-dried precursors. X-ray diffraction (XRD), pore and grain size measurements revealed that freeze-drying leads to a very fine-grained material with substantial mesoporosity. In contrast, air-drying results in coarse grains and an essentially microporous material. Four different methods were tested for restoring the cation exchange capacity (CEC) of the prepared PILCs. The most effective method proved to be exposing the material to ammonia fumes, then soaking it in a NaCl solution at pH = 10. Strontium and Cs kinetic experiments were carried out with PILCs after restoring their CEC by this method. The results revealed 1 fast uptake component in both materials but with different relaxation times for each PILC.

Key Words: Cation Exchange Capacity • Delamination • Pillared Clay • Radiocesium • Radiostrontium • Uptake

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