

Effect of kaolin on textural, structural and adsorption properties of Ca-exchanged A zeolite.

M. Guerza¹, F. Benaliouche¹, M. A. Benachabane, Y. Boucheffa²

¹Ecole Militaire Polytechnique, BP17 - 16046 Bordj El-Bahri, Algiers, Algeria.
Guerza.mouna@gmail.com

Abstract. The effect of kaolin on textural, structural and adsorption properties of calcium-exchanged A zeolites is examined with a view to using zeolite-kaolin mixtures as adsorbents for the hemostatic applications. The zeolite/kaolin samples are prepared by physical mixing of pure calcium-exchanged A zeolite with appropriate amounts of purified kaolin powder. The pure form of kaolin raw material containing mainly rich well-crystallised kaolinite is obtained via physical-chemical treatments. The kaolin loading rate in the A zeolite samples ranges from 5 to 25 wt.%. The use of diatomic nitrogen molecule as an adsorptive for surface area and porosity determinations show that the addition of kaolin particles on A zeolite induces a specific interactions with surface functional groups and consequently can block the entrances of narrow micropores of A zeolite. The retention capacities for the water molecules and the nature of the interactions responsible for water binding are studied by temperature-programmed thermal desorption technique, performed on thermogravimetric unit. The water adsorption capacity shows a clear dependence on the chemical nature of the zeolite surface and on the textural properties. Both porous volume and water retention capacity estimated during water desorption from adsorbents pores decrease with an increase of kaolin loading rate. The interactions responsible for water binding are closely related to the hydrated cationic species of the zeolite surface and the loading rate of the kaolin in zeolite. Steric effects also should be considered for the adsorption patterns.

Keywords: Zeolite, kaolin, adsorption.