Synthesis and characterization of Na-X zeolite using a diatomitic rock from Albacete (Southern Spain)

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Zeolites are a family of about 200 synthetics and natural minerals, whose structure is basically made of a three-dimensional network of Al-Si tetrahedra arranged to form channels containing water and exchangeable alkaline or alkaline earth cations. Research into zeolites is of great industrial interest and their use is extended to several new technological applications such as radioactive, industrial and agricultural waste-water treatments [1] [2]. A natural diatomite was used to hydrothermally synthesise zeolitic minerals Na-X and Hydroxysodalite. Albacete diatomite from southern Spain (mainly constituted by opaline silica) was chemically treated with HCl and NaOH in order to obtain sodium silicate, a reagent necessary for zeolitic synthesis. The experimental synthesis protocol was performed at 75ºC by mixing the obtained silicatic solution with soda and alumina.Synthesised phases were subjected to chemical-crystallographical and mineralogical- textural characterisation which showed that the Na-X zeolite begins to appear after only 1,5h and reaches its crystallisation climax at 11h. HS appears at 40h. The thermal behaviour and infrared response have values comparable to those found for commercial zeolites.

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[1] Akcay *et al* 2002. Modification of clinoptilolite and its application to uranium removal. Pp. 14 in: *Zeolites '02: 6th International Conference on the Occurrence, Properties, Utilization of natural zeolites* (P. Misaelides, editor) [2] Andrews *et al* 2002. Removal of toxic metals from acid mine waters using combined chemical neutralization and zeolite ion exchange: Results of laboratory and field piloting. Pp. 27-28 in: *Zeolites '02: 6th International Conference on the Occurrence, Properties, Utilization of natural zeolites* (P. Misaelides, editor).