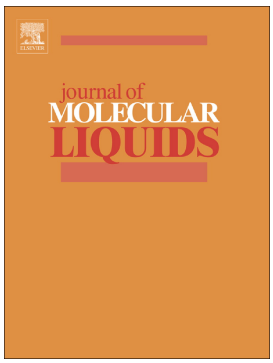

Effect of an external magnetic field applied in batch adsorption systems: Removal of dyes and heavy metals in binary solutions

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EFFECT OF AN EXTERNAL MAGNETIC FIELD APPLIED IN BATCH ADSORTION SYSTEMS: REMOVAL OF DYES AND HEAVY METALS IN BINARY SOLUTIONS

S.L. Flores López, [a], M.R. Moreno Virgen, *,[a], V. Hernández Montoya, [a], M.A. Montes Morán, [b] , R. Tovar Gómez, [a], N.A. Rangel Vázquez, [a], M.A. Pérez Cruz, [c], M.S. Esparza González, [a]

[a] TecNM/Instituto Tecnológico de Aguascalientes, C.P. 20256, Aguascalientes, Aguascalientes, México.

[b]Instituto Nacional del Carbón, INCAR-CSIC, Apartado 73, E-33080 Oviedo, Spain.

[c]Facultad de Ciencias Químicas, Universidad Autónoma de Puebla, Apdo. Postal J-55, Puebla, Pue., México.

* corresponding author: moreno_virgen@yahoo.com.mx

Abstract

The magnetic field assisted adsorption is a non-conventional method employed in removal of water pollutants and due to the promising results found until now, we have applied this procedure with single and binary systems. Zeolites and carbons were employed as adsorbents materials, which were modified with calcium and iron to improve its adsorption and magnetic properties, respectively. Adsorbents were physicochemical (elemental analysis, SEM/EDX analysis, X-ray diffraction and FT-IR spectroscopy) and magnetically characterized to describe their composition, textural and magnetic behavior under magnetic field exposition. Adsorption isotherms were conducted in batch systems with and without magnetic field using as contaminants Cd^{2+}, Zn^{2+}, Basic Blue 9, Basic Green 1, Reactive Black 5 and Reactive Red 2. The results are indicating that there are increments when was applied the magnetic field up to 114% and 55% in single solutions, and 15% and 63% in binary mixtures for heavy metals and dyes, respectively. Finally, with the purpose to elucidate the adsorption mechanism the characterization, adsorption capacities and molecular simulation were correlated to explain the phenomena involved and the role played by magnetic field in improving results.