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Zeolite Y-Carbonaceous Composite Membrane with a Pseudo Solid Foam Structure Assessed by Nanofiltration of Aqueous Dye Solutions

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ABSTRACT:

This work invents a composite membrane constituted by the granular NaY zeolite as the major phase (~ 74 vol. %), which is integrated with carbonaceous (~23 vol. %) and glass-fiber phases. The zeolite particles are intimately bonded by carbonaceous to constitute a dendritic distribution of zeolite-carbonaceous amalgam frames (ZCF) that enclose micron-scaled voids, thus resembling a solid foam. These copious voids act virtually as tiny separation cells so as to favor permeance. The membrane shows high rejection to traces of water-soluble dyes, namely Methylene Blue (MB), Rhodamine-B (RB) and Methyl Orange (MO). Rejection to the probe dye molecules relies on electrostatic-interactions between the molecules and ZCF along carbonaceous pores. The interactions are influenced by the pH of feed since it affects magnitude