

Multicomponent sorption of hexane isomers in zeolite BETA

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Author(s): [Barcia PS](#) (Barcia, Patrick S.), [Silva JAC](#) (Silva, Jose A. C.), [Rodrigues AE](#) (Rodrigues, Alirio E.) Source: AICHE JOURNAL Volume: 53 Issue: 8 Pages: 1970-1981 Published: AUG 2007 Times Cited: [5](#) References: [13](#) [Citation](#) [Map](#) Abstract: Breakthrough curves of single, binary, ternary, and quaternary mixtures of hexane (C-6) isomers n-hexane (nHEX), 3-methylpentane (3MP), 2,3-dimethylbutane (23DMB), and 2,2-dimethylbutane (22DMB) were performed in commercial pellets of zeolite BETA (BEA structure), covering the temperature range between 423 and 523 K and partial pressures up to 30 kPa. From these data, single and multicomponent adsorption equilibrium isotherms were collected. A tri-site Langmuir model (TSL) was developed to interpret the equilibrium data based on considerations about zeolite structure, and a dynamic adsorption model was tested predicting with a good accuracy the behavior of multicomponent fixed-bed experiments. At the partial pressures studied, the sorption hierarchy in the zeolite BETA is nHEX >>> 3MP > 23DMB >> 22DMB. BEA structure demonstrates a significant selectivity between C-6 isomers, especially at low coverage, giving a good perspective regarding their separation by adsorption processes. (c) 2007 American Institute of Chemical Engineers. Document Type: Article Language: English Author Keywords: zeolite BETA; hexane isomers separation; multicomponent adsorption; breakthrough curves; dynamic adsorption model KeyWords Plus: SEPARATION; ADSORPTION; SILICALITE; SIMULATION; PELLETS Reprint Address: Rodrigues, AE (reprint author), Univ Porto, Fac Ingn, Dept Engn Quim, Lab Separat & React Engn, Rua do Dr Roberto Frias S-N, P-4200465 Oporto, Portugal Addresses:
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2. Inst Politecn Braganca, Escola Super Tecnol & Gestao, P-5301857 Braganca, Portugal E-mail Addresses: arodrig@fe.up.pt Publisher: JOHN WILEY & SONS INC, 111 RIVER ST, HOBOKEN, NJ 07030 USA Subject Category: Engineering, Chemical IDS Number: 193NT ISSN: 0001-1541 DOI: 10.1002/aic.11233