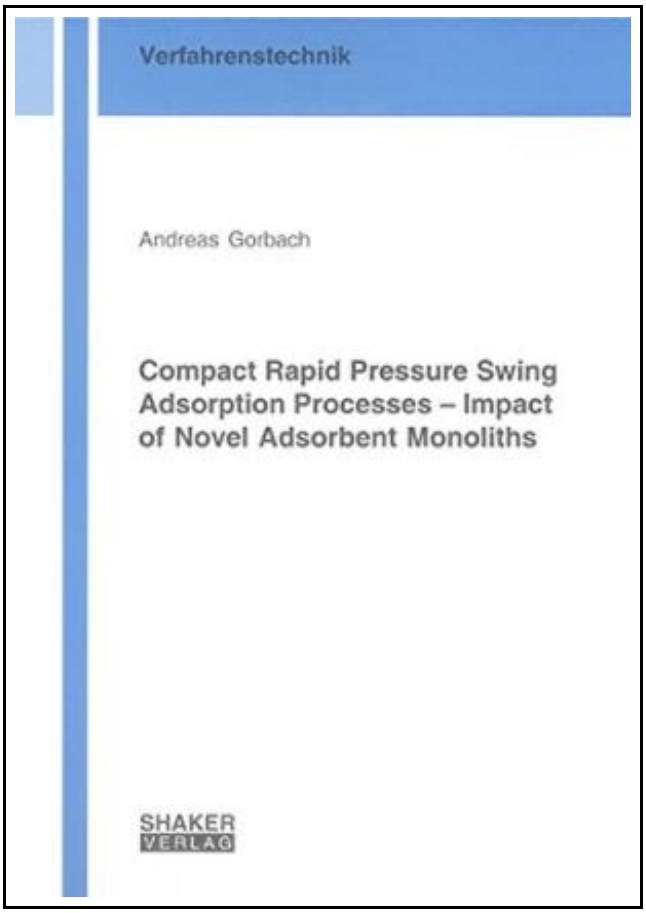
Compact Rapid Pressure Swing Adsorption Processes - Impact of Novel Adsorbent Monoliths



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Reviews

Very helpful for all category of men and women. It is rally fascinating throgh studying period. It is extremely difficult to leave it before concluding, once you begin to read the book.
(Prof. Asia King)

COMPACT RAPID PRESSURE SWING ADSORPTION PROCESSES - IMPACT OF NOVEL ADSORBENT MONOLITHS

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Shaker Verlag Apr 2006, 2006. Taschenbuch. Book Condition: Neu. 210x149x14 mm. Neuware - Regarding the development of energetically efficient units for gas separation and gas purification, Pressure Swing Adsorption (PSA) processes offer a profitable approach. Particularly in small scale applications the compact design of the adsorber is crucial. To achieve the required high productivity, short cycle times must be applied and hence small adsorbent particles must be used, providing sufficiently fast adsorption kinetics. This has been characterized by the term Rapid Pressure Swing Adsorption (RPSA). However, high pressure drop and low mechanical stability of the adsorbent are the limiting factors for particle size and thus process optimization. The approach considered in this work is based upon the usage of novel monolithic adsorbent-polymer materials, featuring low pressure drop and high mechanical stability. The monoliths are manufactured by extrusion of highly filled zeolitic polymer matrices using thermoplastic materials as plasticizing aid and binder. After the forming process, the added wax is removed by thermal after-treatment, creating a secondary pore structure in the polymer matrix and hence specifying its resulting mass transport properties. The potential of this development is evaluated by comparing both adsorption equilibria and adsorption kinetics of the new-type adsorbents with commercial adsorbent pellets used in randomly packed beds. The thermodynamic equilibrium has been quantified in an automated, isothermal high vacuum apparatus based on a static-volumetric principle. The mass-transfer is determined by a common dynamic-column breakthrough method. The adsorption of water vapor on a Zeolite 4A-Polyamide compound is considered as example case. In a next step, proper models for adsorption equilibria and kinetics have been developed, fit to the measured data and implemented into a detailed RPSA process model. This model has been validated with an experimental setup of a single column RPSA unit. Since the approach of the Cyclic Steady...

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