

dynaSorb BT™ Supports Adsorption Science

CHARACTERIZING MATERIALS FOR SEPARATION APPLICATIONS

Investigations with the **dynaSorb BT™** provide technically relevant information on adsorbents used in gas separation processes. Dr. Möllmer at the «Institut für Nichtklassische Chemie» (INC, Germany, office@inc.uni-leipzig.de) uses the **dynaSorb BT™** for down-scaling of industrial gas separation processes and for the determination of mixed gas adsorption equilibria. The Group is working in different fields related to separation processes. CO₂-removal from methane-rich gas mixtures, purification of hydrogen containing mixtures, desulfurization of bio gas and cleaning of waste air are just a few examples chosen from a bunch of applications. The **dynaSorb BT™** enables them to work out, to adjust and to improve the conditions for an optimal separation performance.

DR. MÖLLMER EXPLAINS THAT A SEPARATION CAN BE ACHIEVED IN DIFFERENT WAYS:

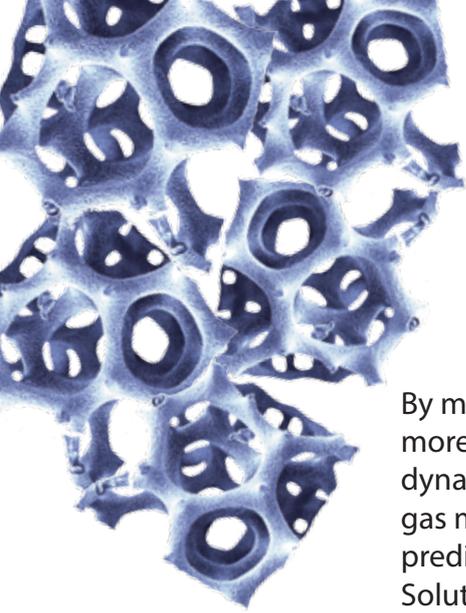
- 1 - Separation by thermodynamic effects, based of differences in sorption isotherms
- 2 - Separation by kinetic-steric effects, based on different sorption rates of gas species on the adsorbent

In some cases both effects can occur simultaneously and competitive adsorption effects can not be neglected. Therefore, for selecting the optimal adsorbent material, the group suggested experiments with gas mixtures and flow conditions close to the conditions in the real application. The **dynaSorb BT™** is being used for this purpose.

Characterizing Today's Materials — Discovering Tomorrow's™

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INVESTIGATION OF MIXTURE GAS ADSORPTION EQUILIBRIA

By measuring breakthrough curves with two or more adsorptives at low flow conditions, the dynaSorb provides equilibrium sorption data of gas mixtures. Such data can be compared with predictive calculations by the Ideal Adsorbed Solution Theory (IAST) to check ideality of the adsorptive/adsorbent system. Experimental results of competitive adsorption phenomena are helpful for the estimation of the thermodynamic selectivity in a wide range of pressure and temperature by calculations with Ideal Adsorbed Solution Theory.



Evaluation of Sorption Kinetics

Many separation processes utilize different sorption kinetics for the separation of gases with adsorbents like e.g. Carbon Molecular Sieves. A dynamic sorption experiment is the only approach to determine relevant mass transfer coefficients involved in those separation processes.

A POWERFUL SIMULATION TOOL FOR DEMANDING APPLICATIONS

The complementary simulation software dynaSIM supports us with comprehensive data reduction capabilities. In addition, it is a predictive tool used for planning the next experiments and even to emulate complete Pressure Swing Adsorption (PSA) cycles based on breakthrough measurements.



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