Grenzflächenphysik

UNIVERSITÄT LEIPZIG

Diffusion in Nanoporous Materials: from Fundamentals to Practical Issues

Sonderkolloquium der DECHEMA-Fachsektion Zeolithe

mit Prof. Dr. Douglas M. Ruthven, USA, Humboldt-Forschungspreisträger 2002

„ Perspectives on Diffusion in Nanoporous Materials“

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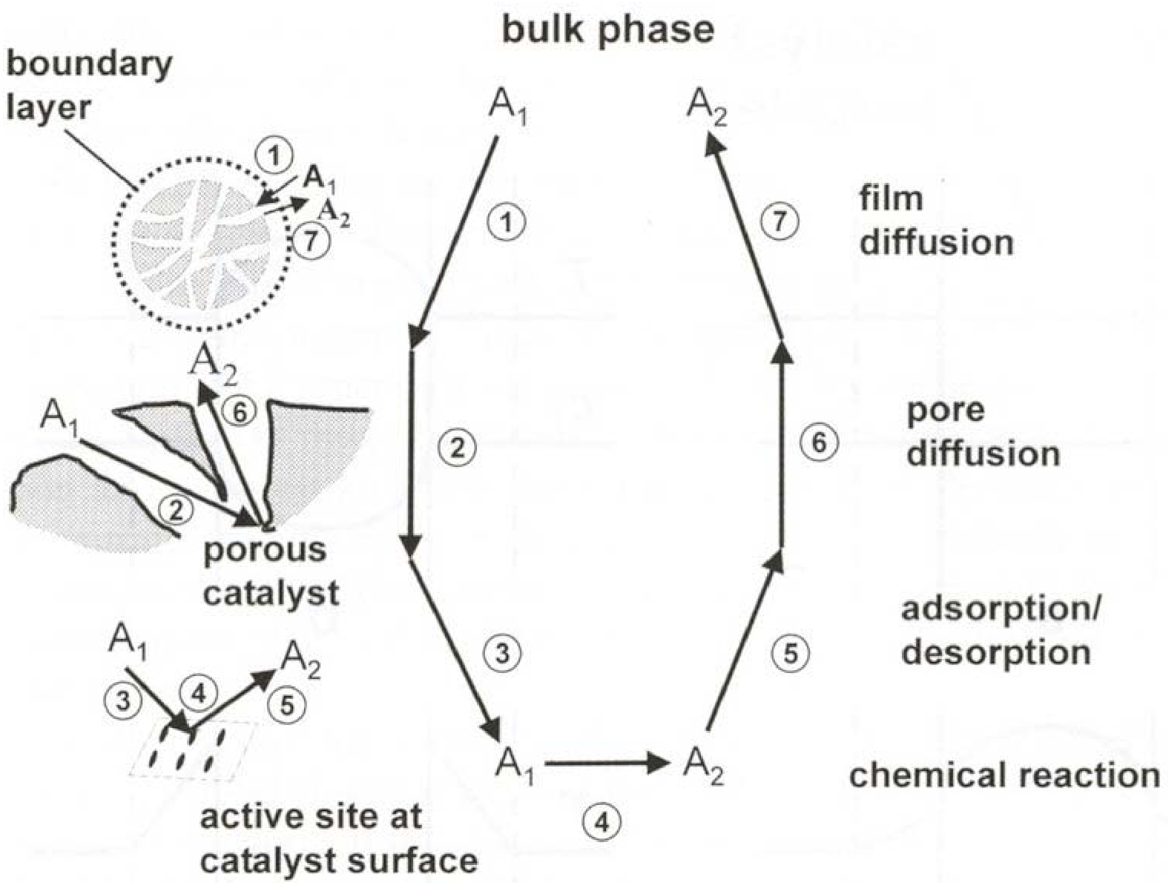
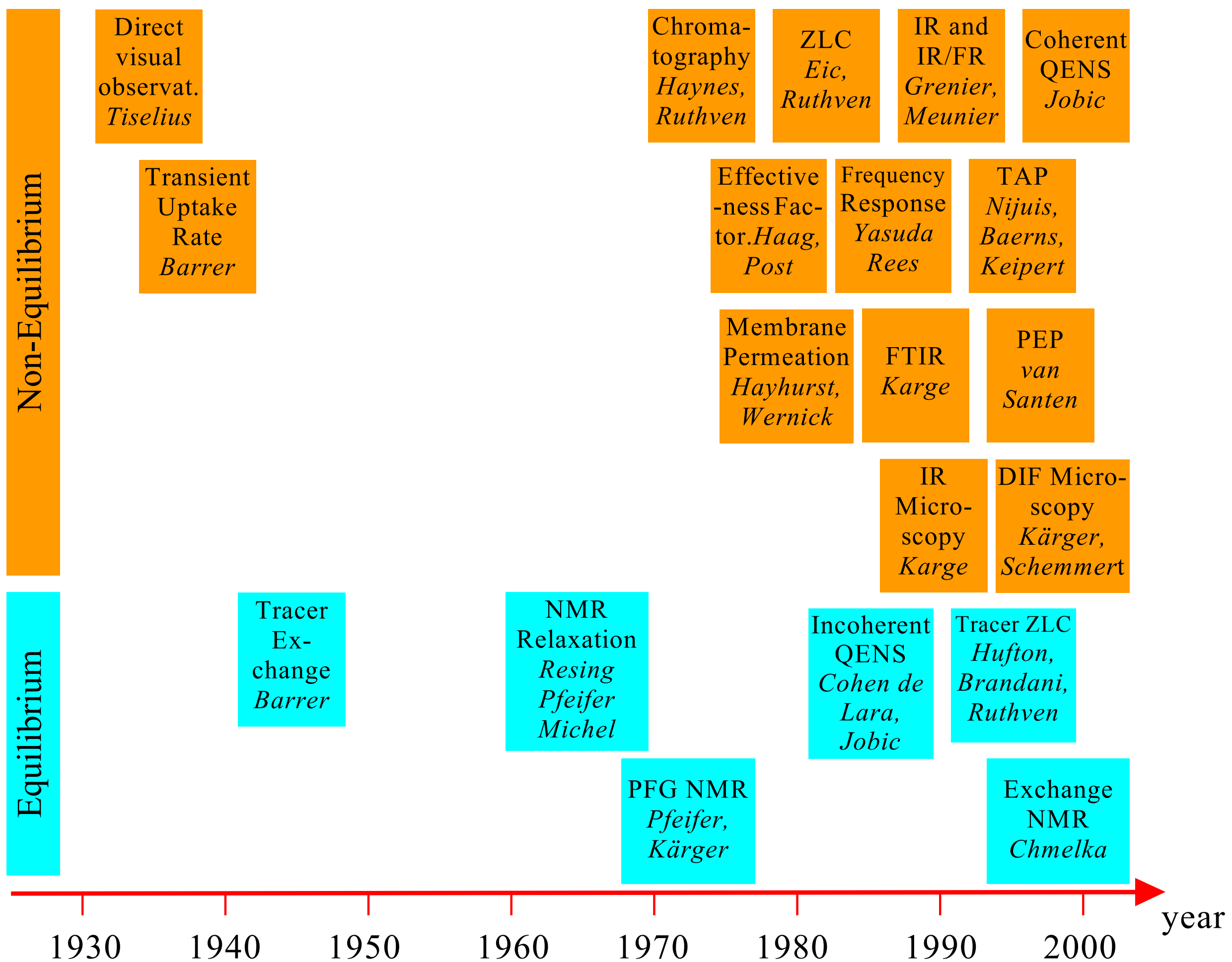


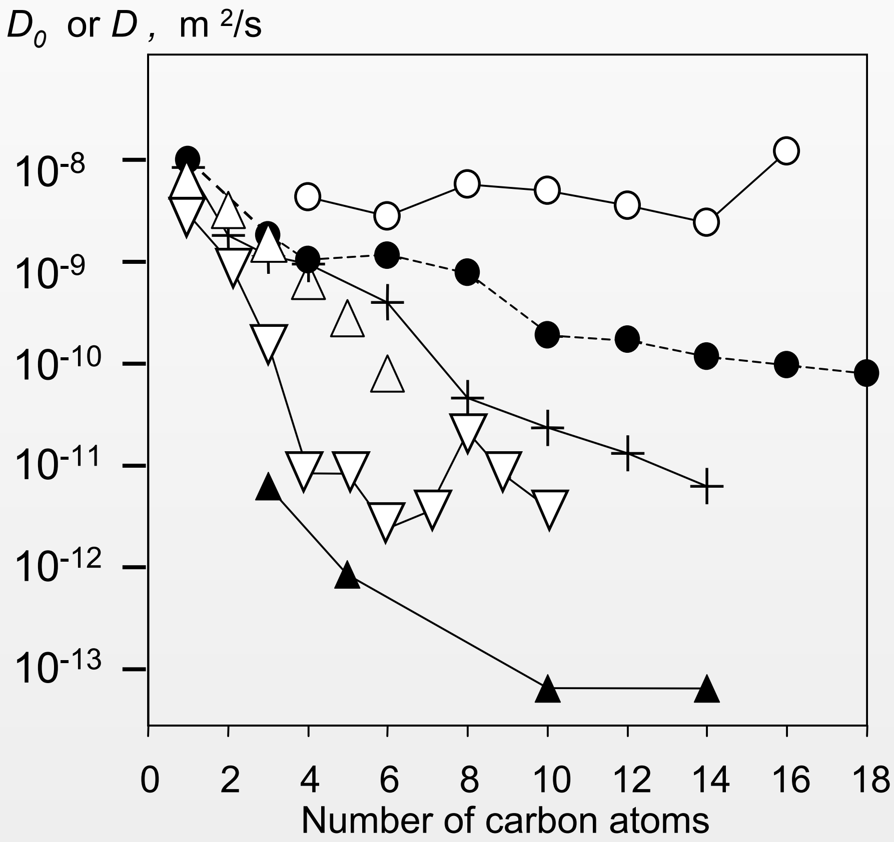
Fig. 1. Individual steps of a simple, heterogeneous catalytic fluid–solid reaction $A_1 \rightarrow A_2$ carried out on a porous catalyst.

E. Klemm, M. Köstner, G. Emig: Transport Phenomena and Reaction in Porous Media

in: F. Schüth, K.S.W. Sing, J. Weitkamp: Handbook of Porous Solids, Wiley-VCH, 2002

Year of First Application of Diffusion Measuring Techniques





Diffusion Coefficients of n-Alkanes in Zeolite MFI at 300K (low concentrations), determined by

MD-simulation (○),
Brownian Dynamics (●),
QENS (+),
Permeation (∇),
ZLC (♦), and
PFG NMR (Δ).

	Non-Equilibrium		Equilibrium
	transient	stationary	
macroscopic	**Sorption/Desorption** **Frequency Response** **Zero Length Column** IR-FR Positron Emission Profiling (PEP) Temporal Product Analysis (TAP) IR Spectroscopy	**Membrane-Permeation** Effectiveness Factor in Chemical Reactions	Tracer Sorption/Desorption **Tracer ZLC**
mesoscopic	**IR Microscopy**	**Single-Crystal-Permeation**	**Tracer-IR-Microscopy**
microscopic	**Interference Microscopy**		**Pulsed Field Gradient NMR (PFG NMR)** **Stray Field Gradient NMR (SFG NMR)** **Quasi-Elastic Neutron Scattering (QENS)**

Jürgen Caro **Stefano Brandani** **Herve Jobic**