ChemISTry Colloquia

Nanoporous Materials for Catalysis and Energy Applications

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https://www.tu.berlin/funktionsmaterialien

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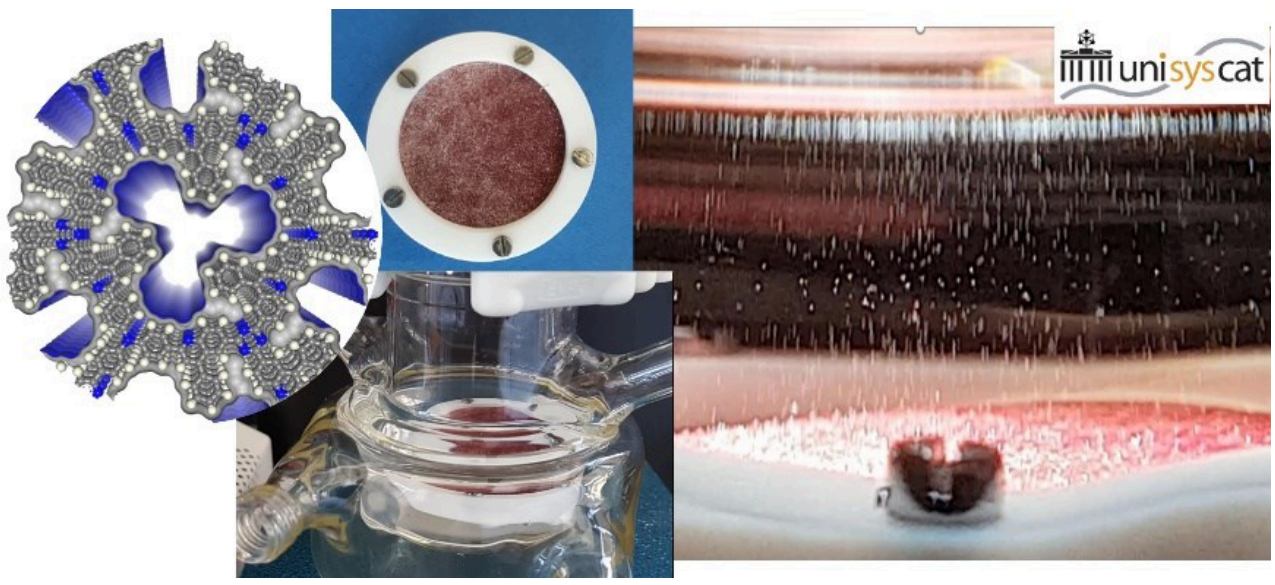
Raiffeisen Lecture Hall

Catalysis is a key technology of utmost importance for the economic and ecological welfare of societies because it is the decisive part of developing resource-saving and sustainable processes for energy and materials conversion. Porous functional materials with large accessible surface areas and defined functionalities on their surface play a key role as catalysts for a range of viable reactions. One example of such porous functional materials are covalent organic frameworks (COFs), which combine the advantages of organic polymers with conventional inorganic or hybrid porous materials, such as zeolites, activated charcoals or metal organic frameworks.[1] COFs exhibit ordered pore structures and tuneable pore sizes together with exceptionally high porosities and surface areas. Furthermore, as they are solely composed of organic moieties, an exquisite control over the chemical nature of the large accessible surface areas as well as the physical properties of the resulting frameworks is possible. These features make COFs interesting for emerging applications such as fresh water generation[2] or energy storage[3] and also open new prospects in the field of catalysis, electro- and photocatalysis.[4]



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2. a) S. Cao, A. Thomas, C. Li *Angew. Chem. Int. Ed.* **2023**, *62*, e202214391, b) C. Li, S. Cao, J. Lutzki, J. Yang, T. Konegger, F. Kleitz, A. Thomas *J. Am. Chem. Soc.* **2022**, *144*, 3083–3090
3. X. Zhao, P. Pachfule, A. Thomas, *Chem. Soc. Rev.* **2021**, *50*, 6871-6913
4. a) X. Zhao, X.; Pachfule, P.; Li, S.; Langenhahn, T.; Ye, M.; Schlesiger, C.; Praetz, S.; Schmidt, J.; Thomas, A. *J. Am. Chem. Soc.* **2019**, **141**, 6623-6630; b) J. Yang, S. Ghosh, J. Roeser, A. Acharjya, C. Penschke, Y. Tsutsui, J. Rabeah, T. Wang, S. Y. Djoko Tameu, M.-Y. Ye, J. Grüneberg, S. Li, C. Li, R. Schomäcker, R. van de Krol, S. Seki, P. Saalfrank, A. Thomas *Nat. Commun.* **2022**, *13*, 6317 c) A. Alam, B. Kumbhakar, A. Chakraborty, B. Mishra, S. Ghosh, A. Thomas, P. Pachfule *ACS Materials Lett.* **2024**, *6*, 2007–2049

Arne Thomas heads the Functional Materials group at the Institute of Chemistry at TU Berlin. He studied chemistry in Giessen, Marburg and Edinburgh and completed his doctoral thesis at the MPI of Colloids and Interfaces, Potsdam/Golm, under Markus Antonietti. After a postdoctoral stay at the University of California, Santa Barbara, USA, in the group of Galen Stucky, he returned to the MPI-KGF as a group leader. In 2009, he was appointed to a professorship for functional materials at the TU Berlin. His group is interested in nanostructured and porous inorganic and organic materials and their diverse applications in gas separation, energy storage or catalysis. Since 2019, he has been the spokesperson of the Cluster of Excellence Unifying Systems in Catalysis – UniSysCat, in which over 60 working groups in the Berlin/Potsdam region are working on new sustainable catalysis concepts.