TYPICAL APPLICATION

Filtration

- Toxic Gas Adsorption
- Personal Protection
- Cabin Air management
- Product safety (Trace gas getter)

Separation

- Industrial Separation Processes (PSA, TSA)
- Hydrocarbons Separation
- CO_2 Separation

Gas Storage

- Energy carriers
- Specialty gases

R&D Services

Consultation & Advice | Feasibility studies | Application & Transfer

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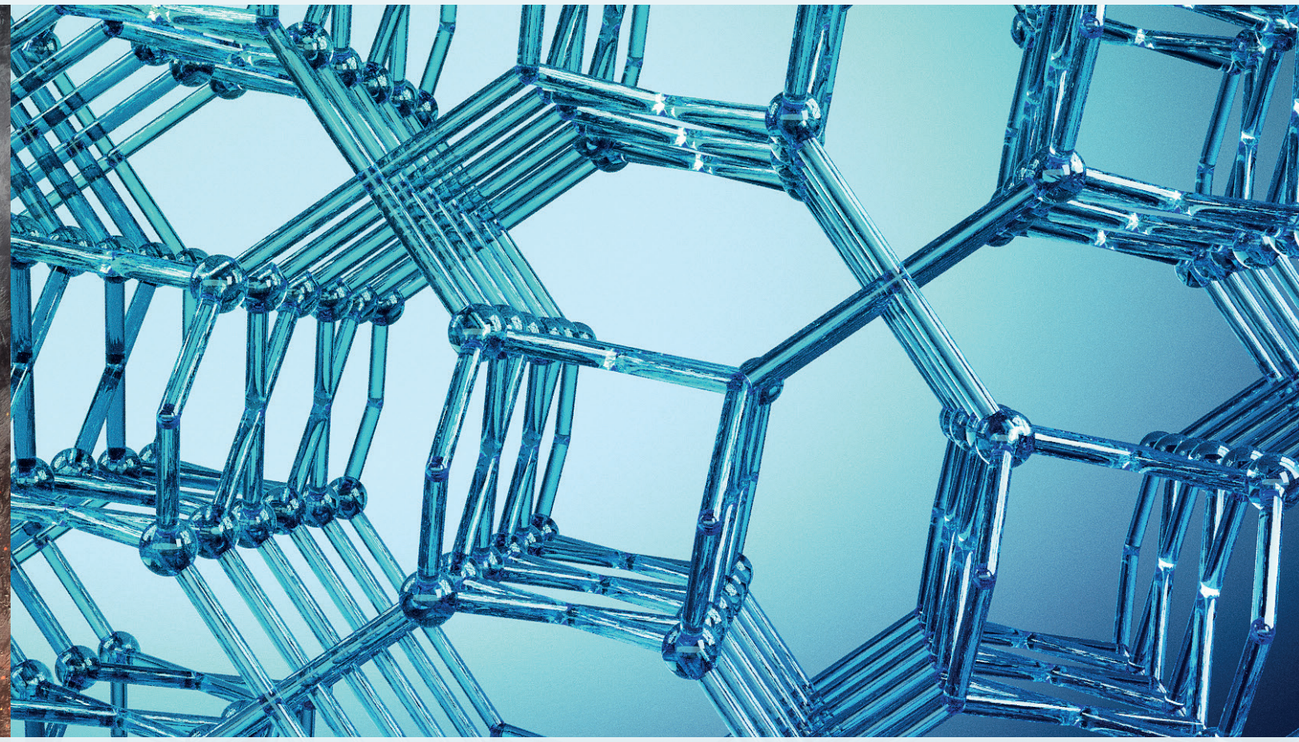


ADVANCED ADSORBENTS

TAILORED FILTRATION

MATERIAL ANALYTICS

R&D SERVICES

MATERIALS CENTER DRESDEN

Advanced Materials
for your Application

ADVANCED ADSORBENTS

Metal Organic Frameworks (MOFs)[1]

MOFs are a relatively new class of crystalline porous materials built from inorganic clusters and organic linkers. MOFs can be tailored to your application because of the diversity of their building blocks. Various functions can be installed with the use of different metal centers and functional side groups on the organic linker molecules. Pore sizes can be tuned by the length of the linkers and specific surface areas (SSA) up to 7000 m²/g are possible.

Porous Carbon Materials[2]

Porous carbon materials are established adsorbent materials for many applications such as gas separation, water purification, catalyst supports, and electrodes for electrochemical double layer capacitors and fuel cells. We offer novel carbon materials with unusual properties, like high hydrophilicity, narrow pore size distribution, and ultra-high surface areas.

Silica Materials & Zeolites

Silica materials and zeolites are special adsorbents with regular or irregular pore structures and tunable surface functionalities like metal sites or acidity functions. The thermal stability facilitates regeneration at high temperature for heterogeneous catalysis. Only a small number of zeolites is produced in industrial scale. Materials Center offers customized zeolites with defined functionalities and ordered mesoporous silicas.

Porous Polymers

Porous polymers, built from all-organic components, can be synthesized with tailored pore structures and functionalities. Solution processing and a highly hydrophobic surface make them attraktive as novel sorbents. Textiles, membranes and films can be coated with porous polymers by solution coating.

TAILORED FILTRATION MATERIALS

Shaping: Granulates, Textiles, Foams

- Granulate diameter 0.4 - 3 mm
- Crush strength until 10 N (1.02 kg)

Individual Adsorbents Synthesis

- Impregnation & Coating
- Customized Synthesis (MOFs, Zeolites)
- Upscaling
- Specialized Adsorbents (for filtration, gas storage, catalysis)

MATERIAL ANALYTICS

- Advanced Gas adsorbtion (high & low pressure)
- Porosity Analysis (Surface area, pore volume)
- Special Gases & Vapors (CO_2, Aldehyds, Aromatics, H_2O)
- Structure & Composition (XRD, SEM, ICP-OES, TG)

SELECTED PRODUCTS

MIL-101/MIL-100 MOFs

Family of MOFs with similar cage-like structures, stable against air and moisture.

Mesoporous cages with microporous windows. Ultra-high capacities for many gases: CO_2, methane, and other organic molecules. Reversible water adsorption with high capacities ideal for adsorption-based, thermally driven chillers or heat pumps.

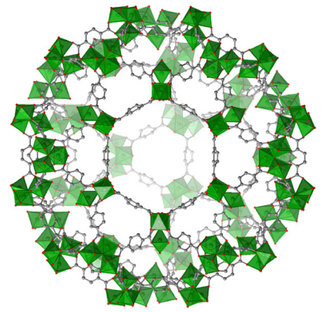
MIL-101(Cr)

Most prominent and most stable member of this family, SSA up to 4000 m²/g. Available in 10 g amounts. Examples for capacities:

- Carbon dioxide: 176 wt-% (50 bar, 304 K)[3]
- Methane: 22 wt-% (60 bar, 304 K)[3]
- N-butane: 63 wt-% (0.8 bar, 303 K)[4]
- Water: 128 wt-% (293 K, 100 % humidity)[5]

MIL-100(Fe), MIL-100(Al)

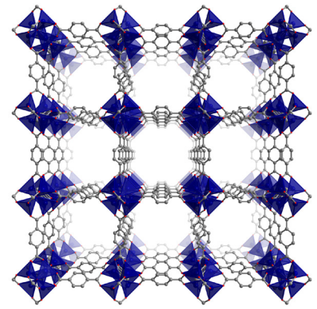
SSA up to 3000 m²/g, harmless for health and environment. Available in 100 g amounts.



MOF-5

An early MOF (discovered 1999) with very regular cubic micropores. It shows a SSA up to 3500 m²/g and ultra-high-capacities for many gases like methane (17 wt-% at 100 bar, 298 K) and carbon dioxide (48 wt% at 14 bar, 298 K).[6]

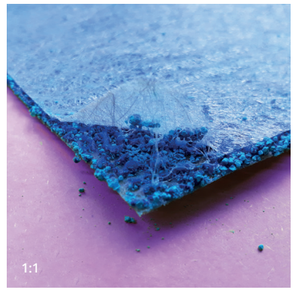
Ideal reference material in MOF science and an excellent material for the storage of inert gases. Materials Center is the only provider worldwide for 100 g amount of this MOF.



Shaping

For the application of adsorbents in separation columns or gas storage cyclinders dust-free granulates with low pressure drop and high mechanical stability are required.

We offer binder based granulation of powders to granules (diameter 0.4 - 3.0 mm, crushing strength up to 10 N = 1.02 kg) and the impregnation of textiles (typical loading 10 g/m²). Granules can be immobilized on textiles (typical loading 500 g/m²).



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