POLYMERS OF INTRINSIC MICROPOROSITY (PIMs)

THE TECHNOLOGY

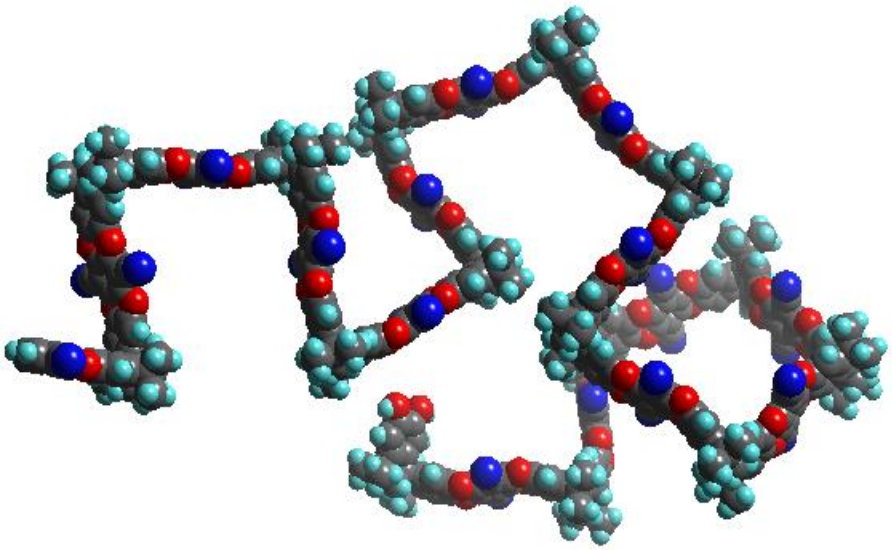
Microporous materials are of great technological importance for adsorption, separation and heterogeneous catalysis due to their large and accessible porosity and surface areas.

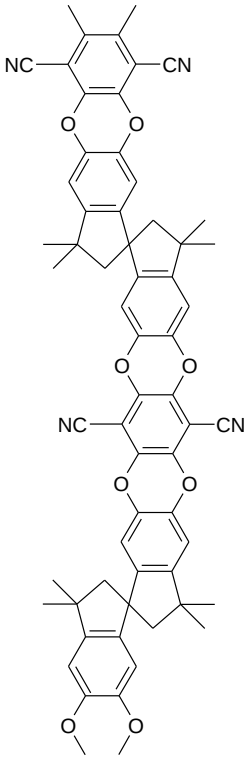
Until recently there have been two main classes of microporous material widely used in industry – these are the crystalline zeolites (aluminosilicates) and activated carbons.

Researchers at The University Manchester have developed a novel class of microporous material that is described as Polymers of Intrinsic Microporosity (PIMs). This new class of material comprises organic polymers that due to their highly rigid and contorted structures do not pack together efficiently and therefore create interconnected, molecular sized holes.

PIMs may be prepared either as highly insoluble network polymers or as soluble polymers which are suitable for solution-based processing – a unique advantage over other microporous materials.

PIM-1





CHEMICAL PROPERTIES

- Thermally stable to >350ºC
- Glass transition temperature > 350ºC
- Soluble in organic solvents e.g. THF, Chloroform
- May be solution cast into films
- Mw ~ 100,000 - 200,000
- Pore size <2 nm
- Surface area >700 m^2/g
- Chemical functionality can be built into monomer
- May be cross-linked with metals

POTENTIAL APPLICATION AREAS

PIM membranes offer increased selectivity and permeability and can be used for example in gas separation, pervaporation and solvent-resistant nanofiltration. PIMs are also useful for carbon capture, hydrogen storage and heterogeneous catalysis.

- Membranes: gas separation, pervaporation & nanofiltration
- Selective adsorption
- Heterogeneous catalysis (transition metal ions for catalytic activity)
- Gas storage (reversible adsorption on the internal surface of a microporous material)

PATENT STATUS

US granted patent number 7690514, Nanoporous Polymers (PIMs) owned by The University of Manchester.

OPPORTUNITY

UMIP is open to all forms of collaboration from licensing to research development programmes. For further information about PIMs, please visit: http://people.man.ac.uk/~mbdsspmb/

For commercial discussions, please contact:

Clare Wood, Business Development Portfolio Manager, UMIP, Core Technology Facility, 48 Grafton Street, Manchester M13 9NT ✉: clare.wood@umip.com, ☎: + 44 (0) 161 306 8534