

Separation and purification

Separation and purification of gases and liquids are important elements in industrial processes. We are at present involved in the development/evaluation of adsorbents and membranes for

- Purification of produced water offshore
- Desulphurisation of cracker naphtha
- CO₂ capture from gas fired power plants and industrial waste streams

Adsorbents/membranes

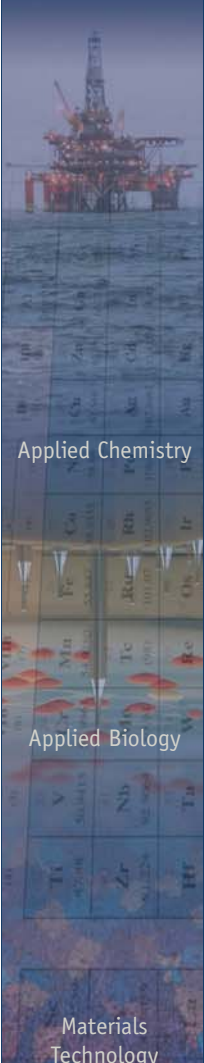
The development of new or improved adsorbents and membranes benefits from our experience on synthesis of micro- and meso-porous materials, hydrotalcites, supported metal catalysts etc. New micro-porous and meso-porous systems developed at SINTEF show a potential for separation and purification purposes.

Characterisation

A variety of characterisation methods are employed for the adsorbent/membrane composition, structure and surface properties. Chemical composition is determined by methods such as Atomic Absorption Spectroscopy (AAS), X-ray fluorescence, microprobe and Inductively Coupled Plasma Spectroscopy (ICP). Structure characterisation is carried out by X-ray diffraction (XRD), Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM), X-ray Photoelectron Spectroscopy (XPS), Infrared Spectroscopy (IR) and Solid State as well as high resolution Nuclear Magnetic Resonance (NMR) Spectroscopy.

Testing

For adsorbents we perform testing both as sorption isotherms and as dynamic testing (break through curves).



Concentration measurements are made with whatever method seems appropriate, including UV Spectroscopy, Gas Chromatography (GC) and Mass Spectroscopy (MS).

Evaluation of both in-house developed and commercial adsorbents and membranes are carried out using tailor-made or existing test facilities.

Combinatorial equipment and expertise are used for high throughput adsorbent synthesis and testing.

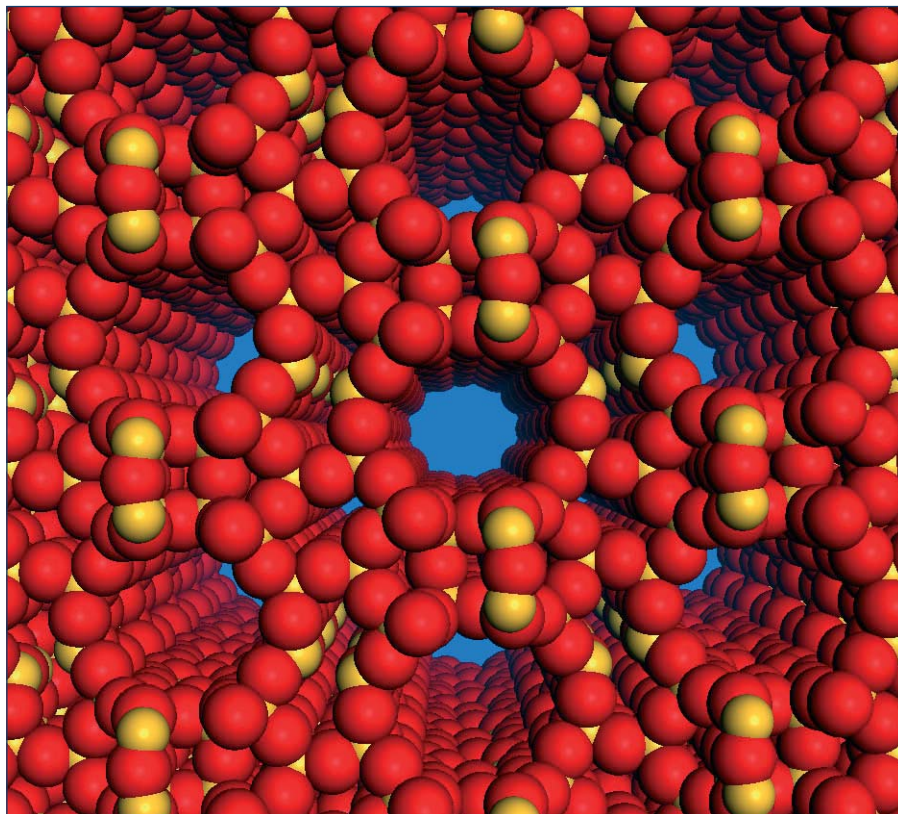


Photo: Øivind Hagen, Statoil

Results

The work has resulted in several patents and publications on purification of water and separation of hydrocarbon streams by means of adsorbents and membranes.



SINTEF Materials and Chemistry

Hydrocarbon Process Chemistry

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