

Pre-combustion membrane separation

Membranes, made of either polymers or ceramics, can be used to separate carbon dioxide (CO₂) from other gases. CO₂CRC is investigating new types of membranes and processes to improve their effectiveness. One of the challenges with membrane technologies is making them robust enough to withstand the harsh environment of industrial waste gases.

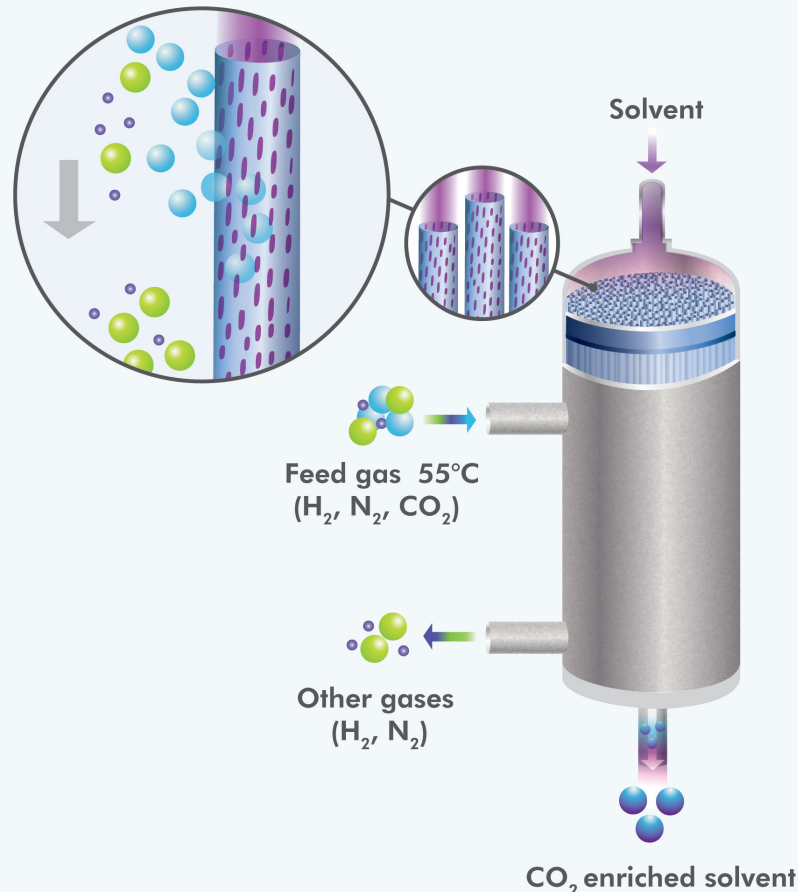
Membranes can be used in two ways; either as a method of allowing CO₂ to be absorbed from a gas stream into a solvent (membrane gas absorption) or on their own, much like a filter (gas separation membranes).

Membrane Gas Absorption

In membrane gas absorption, a membrane separates the feed gas from a liquid solvent. The CO₂ is absorbed into the solvent via pores in the membrane, while the other gases are not. The CO₂ can then be removed from the solvent as in solvent absorption.

CO₂CRC trials use a hollow fibre membrane module to:

- test a range of membrane materials with a range of solvents; and
- evaluate the performance of each configuration.



Membrane gas absorption: hollow fibre module.

Gas Separation Membranes

CO₂ can selectively pass through gas separation membranes, allowing CO₂ to be removed from the feed gas.

CO₂CRC trials aim to:

- test a number of gas separation membrane strategies (for example, removing H₂ first, then the CO₂ second);
- investigate the influence syngas and minor gas components have on membrane performance and plasticization; and
- investigate the separation performance of a number of molecular sieving membranes at high temperatures. These membranes separate gases based on their size. They are particularly suited for use when the process includes a water gas shift reaction which will maximise CO₂ capture.

