



CO₂ Capture using Amine Processes:
International Cooperation and
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PTFE MEMBRANE CONTACTOR TESTING

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PUBLIC SUMMARY

While many technologies have been developed for capturing carbon dioxide (CO₂) from industrial sources, chemical absorption remains the most suitable method for large-scale operations. Conventional absorption equipment is currently being tested in a variety of small-scale pilot plants around the world, and will most likely be used for the foreseeable future. However, membrane contactors may be a potential replacement in the long-term development of CO₂ absorption technologies.

Membrane contactors have been tested in gas absorption applications for the past twenty years. Studies indicate that membrane contactors may be able to achieve the same level of performance as packed columns, or better, while reducing the overall capital costs and operating expenses. This work extends the body of knowledge by conducting detailed studies into the performance of microporous polypropylene (PP) and polytetrafluoroethylene (PTFE) hollow fibre membranes using the overall mass transfer coefficient ($K_G a_v$) as a basis of comparison. It is essential to have realistic estimates for mass transfer performance in order to properly assess the potential of membrane contactors for both absorption and desorption operations.

Experiments conducted with aqueous monoethanolamine (MEA) solutions indicated that PP are susceptible to wetting, while PTFE membranes maintain hydrophobicity and performance. Ongoing work is evaluating the potential of polyvinylidene fluoride (PVDF) membranes. Initial results indicate that the performance of the PVDF membranes may be acceptable when comparable to the significantly more expensive PTFE membranes.

Overall, laboratory-scale membrane contactor systems have been shown to be a potential technology for absorbing CO₂ from flue gas streams, but the solvent-membrane relationship is a critical factor that can significantly affect system performance. Additional research is needed to test larger membrane contactors in a pilot plant scale operation.

The rest of this document is project CONFIDENTIAL.

