Membrane Society of Australasia

www.membrane-australasia.org

July 2009 Newsletter

Welcome from the Co-chair

Welcome to the Membrane Society of Australasia Newsletter. This edition, following closely from the previous edition in June, features a *Research Spotlight* on an Australian-German collaboration developing advanced gas separation membranes that may be suitable for use in low-emission coal-fired power stations of the future. Clearly, this and other technologies will be essential for Australia to achieve a low emission future, and it is pleasing to see membrane technology gaining some interest in this field, which has been traditionally dominated by solvent based technology.

The *Event Spotlight* for this edition is on Euromembrane 2009, to be held in Montpellier, France. Euromembrane is one of the regular features on the membrane conference circuit, and this year should be an excellent event.

We have also taken the time to highlight a few of our corporate members in this edition, and bring their activities and operations to the attention of our members and the wider community.

Next week a number of MSA members will be participating in AMS-5, the conference of the Aseanian Membrane Society in Kobe, Japan. At this conference the MSA will formally bid for the right to host the 2014 International Congress on Membranes and Membrane Processes (ICOM 2014). A lot of hard work has gone into the bid preparation, and we wish them all well.

As always, contributions to for future editions of the MSA newsletter are always welcome. Please send them by email.

Bradley Ladewig – Co-chair of the Inaugural Board

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In this issue:

Research and Demonstration Spotlight

German-Australian collaboration tests new nanostructured metal supported membranes

Since 2007, the German-Australian collaborative research project "Nano-structured Ceramic and Metal Supported Membranes for Gas Separation" has been running. This project combines the know-how from scientists from *Forschungszentrum Jülich* (FZJ), a German research institution, which is located near Cologne and Dusseldorf, and *The University of Queensland* (UQ), in Brisbane, Australia. The main task of the cooperation is the development of a hydrostable silica membrane supported by a steel substrate, for the separation of gases.

The silica cobalt gas separation membrane was fabricated on a substrate of 316L steel, with interlayers of 310S steel, yttrium-stabilized zirconia, and γ-alumina. This created a graded pore size structure to allow the minimisation of the gas separation layer thickness while providing adequate mechanical strength and high flux through the support.

While the group of Associate Professor Joe da Costa at UQ focussed their work on the optimisation of the functional gas separation layer using sol-gel methods, the scientists from Jülich under the guidance of Professor Stöver improved the technology of manufacturing suitable metal substrates, which allow the easy incorporation of the membrane into steel systems.

The membrane was placed in the desulfurized flue gas stream of a power plant, for 1100h and subsequently tested for single gas permeance and characterized via SEM and EDX. Diffusion of nickel and chromium during sintering was observed at the interface of the 316L/310S steels, resulting in a reduced capacity to withstand corrosion in this area. Corrosion at the 316L/310S interface and within localized areas of 316L was attributed to water permeation at elevated temperatures during flue gas testing. Micro fractures in the surface of the silica cobalt gas separation layer were also observed, most likely the result of expansion due to corrosion. However, an activated transport mechanism was observed for helium and hydrogen which, when taken in combination with selectivities higher than Knudsen suggests that the layer is not completely compromised.

For further details of this project, please contact Associate Professor Joe da Costa at The University of Queensland.

Metal-doped silica membrane on a stainless steel support, after operating for 1100 h in power station flue gas. Deposition of dust and particles is evident on the membrane surface.

The same membrane as at left, after cleaning to remove surface deposits. The partial corrosion of the substrate can be seen.

Membrane Society of Australasia Corporate Members

The MSA invited our current Corporate Members to provide some details of their operations and activities for this edition of MSA E-News. We were pleased to receive responses from three Corporate Members, which are produced below. We hope to feature the remaining Corporate Members at some stage in the future.

Company name: *Siemens Water Technologies Corp*
Division: *Memcor Australia Pty Ltd*

Memcor Australia Pty Ltd, a subsidiary of Siemens Water Technologies Corp., is the global centre for R&D, design and manufacturing of Memcor's world-leading low pressure membrane products. Memcor products are applied to municipal and industrial applications for potable and process water treatment; wastewater reclaim; pre-treatment to RO; and Membrane Bioreactors (MBR). Memcor water products include both pressurised and submerged format.
Contact email: andrew.groth@siemens.com

Company name: *CH2M HILL Pty Ltd*

CH2M HILL is a global leader in engineering, procurement, construction, management and operations for government, civil, industrial and energy clients. The company has undertaken the world's most challenging mega projects: the world's first carbon-neutral city at Masdar, widening of the Panama Canal, London 2012 Olympics, Gippsland and Luggage Point Advanced Water Recycling Plants in Australia.
Contact email: jim.bloomquist@ch2m.com.au

Company name: *Water Quality Research Australia Ltd (WQRA)*

Membranes have an increasingly important role in drinking water, wastewater and recycled water. WQRA members have identified Membrane and Treatment Technologies as a high priority for new research. WQRA's members include Australian water treatment and supply agencies, health and environment agencies, Universities and private companies in the water management domain.
Company website for further details: www.wqra.com.au

Company: *The Dow Chemical Company*
Division: *Dow Water and Process Solutions*

Dow Water & Process Solutions, a business unit of The Dow Chemical Company, has released the latest version of its ROSA software program. The ROSA (reverse osmosis system analysis) program is a comprehensive membrane engineering tool for system design and evaluation of existing plant performance. The latest version, 7.0.1, includes the two new DOW FILMTEC brackish water reverse osmosis elements, BW30HR-440i and BW30XFR-400/34i. These two new elements allow demineralization and other water treatment systems to operate more consistently and with less cleaning and maintenance, making essential industrial and potable water treatment processes more affordable for power plants, manufacturing operations and municipalities around the world.
Contact email: tobrown@dow.com

Membrane Society of Australasia Corporate Members Continued

Company: *Steri-Flow*

Steri-flow Filtration Systems, located in Lonsdale South Australia has developed and manufactures a range of patented sintered metallic tubular membranes. The membrane pore sizes range from 0.2 micron to 40 micron, and the membrane materials can range from 316L stainless steel through to various exotic grades of stainless steel and also nickel.

The inherent robustness of the membrane allows it to be utilised in harsh and aggressive industrial, chemical and water applications while also withstanding steam sterilisation and chemical cleaning.

Contact email: sales@steri-flow.com

Upcoming Events

Euromembrane 2009

The spotlight for this newsletter is on Euromembrane 2009. This conference is hosted by the European Membrane Society and will be held on 6 - 10 September in Montpellier, France at *Le Corum, Palais des Congrès*. Euromembrane 2009 is jointly organised by the "European Membrane Institute" IEM, in cooperation with the National Graduate School of Chemistry (ENSCM) and the University of Montpellier 2 (UM2).

More Upcoming Events

- Fifth Conference of the Aseanian Membrane Society (AMS-5)
  - 12 - 14 July, 2009
  - Kobe, Japan
- 5th IWA Specialized Membrane Technology Conference for Water and Wastewater Treatment
  - 1 - 3 September 2009
  - Beijing, China.
- Euromembrane 2009
  - 6 - 10 September, 2009
  - Montpellier, France.
- 7th IWA World Congress on Water Reclamation and Reuse
  - 20 - 25 September 2009
  - Brisbane Convention and Exhibition Centre, Brisbane, Australia.
- Membranes: Materials & Processes Gordon Research Conference
  - 25 - 30 July, 2010
  - Colby-Sawyer College, New London, NH, USA.

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