

Workshop Report on 4th MSA Workshop and Networking for the “Ceramic Based Membranes for Gas Separation Applications”

On the 7th August 2015, The “Ceramic Based Membranes for Gas Separation Applications” was successfully carried out at the Australian Institute for Bioengineering & Nanotechnology (AIBN) at The University of Queensland (UQ) with 11 national and international renowned speakers, and a total of 30 registered and on-site attendees. The event was financially sponsored by the Membrane Society of Australasia (MSA) and organized by Drs David Wang (chair) and Guozhao Ji (co-chair) as well as the important supporting staffs of Mrs Huihuang Chen and Tianlong Zhang.



The welcoming messages was delivered by the chairman Dr David Wang from the School of Chemical Engineering (UQ) to give a brief overview of the event and the *modus operandi* of MSA Workshop & Networking Program. The morning session kicked off with a research theme show-cased by senior group members (Prof. Joe da Costa, Drs Simon Smart and Julius Motuzas) of Functional and Interfacial Materials and Membranes Laboratory (FIM²Lab) at UQ. The group was founded in 2006 by Prof. Joe da Costa who leads the premier research laboratories of inorganic membrane technology in Australia, focusing on high temperature gas processing and energy applications. More information about this group can be found in this link <http://www.chemeng.uq.edu.au/fimlab>.

In the first afternoon session, both Dr Marlies Hankel (AIBN/UQ) and Guotong Qin (Beihang University, Beijing) presented their researches on carbon molecular sieving membranes transport simulation and preparation. Both presentations highlighted the importance of designing synthetic strategies of achieving high quality carbon membranes to provide the optimal molecular gas cut-off for gas separation. Dr Michael Dolan, a team leader at CSIRO in Energy research, provided an insight into the economic feasibility and prototype demonstration of solar membrane reformers based on nickel catalyst palladium-supported membranes. The lecture concluded with the technology needs for scale up in terms of membrane manufacturing and hydrogen gas productivity, and by integrating solar-thermal heat, only a marginal 5-10% efficiency gain can be achieved. Lastly, Prof. Shaomin Liu from Curtin University described the trials and tribulations of making ceramic hollow fibre membranes from 10-15 years of past and current research, which promises the potential for membrane scale up and module reduction.

The last session of the day began by PhD students, Mr Stefan Smith and Ms Melanie Kitchin, from CSIRO in the Manufacturing Flagship program, both of whom gave excellent presentations on behalf of Drs Cher Hon (Sam) Lau and Kristina Konstas. Both talks took on the theme of modifying the polymer matrices through the incorporation of metal-organic frameworks (MOFs) and organic frameworks (OFs), which gave a nice change of research topics but still very relevant to industrial gas separations. Continued with this theme, Dr Lei Ge from UQ, presented the importance of minimizing interfacial voids between MOFs and the polymer matrix and several research strategies. It is noteworthy that the last speaker, Prof. Firas Rasoul came from the Kuwait Institute for Scientific Research (KISR), gave a lecture on the overview of research activities in KISR and how they hope to use inorganic membranes to help address some of the research challenges and obstacles in the water and energy nexus.

After the conclusion of the Workshop, several delegates were given a tour visit to the FIM²Lab at UQ by Dr Julius Motuzas, who also gave an introduction of the research activities that are currently being carried within the group. Last but not the least, several delegates enjoyed the Networking event and catching-up “old times” over a dinner at the St Lucy’s next to the UQ Tennis Centre.

