

## General Information

### Symposium Venue

The symposium will be held at Forschungszentrum Jülich, Auditorium (Building No. 04.7) from 5<sup>th</sup> to 6<sup>th</sup> October 2011.

### Start of the Symposium

Wednesday, 5<sup>th</sup> October 2011, Registration 11:00 – 13:00,  
Welcome (D. Stöver): 13:30

### End of the Symposium

Thursday, 6<sup>th</sup> October 2011, 15:30

### Oral Presentations

The Auditorium is equipped with computer and video beamer.

### Registration and Fee

Registration starts 22<sup>nd</sup> August and ends 25<sup>th</sup> September. The fee includes conference materials, coffee break, catering, conference dinner on 5<sup>th</sup> October, shuttle service to location/hotel.

### Fees for

Registration before 14<sup>th</sup> September

Participants: € 190 | Reduced Fee for Students: € 150

Registration between 14<sup>th</sup> and 25<sup>th</sup> September

Participants: € 220 | Reduced Fee for Students: € 180

### Accommodation and Transfer

Blocks of rooms have been reserved for conference participants at the hotels Ibis Marschierort and Ibis Normaluhr at reduced conference rates.

Singleroom: € 79.00 per night incl. breakfast buffet and VAT

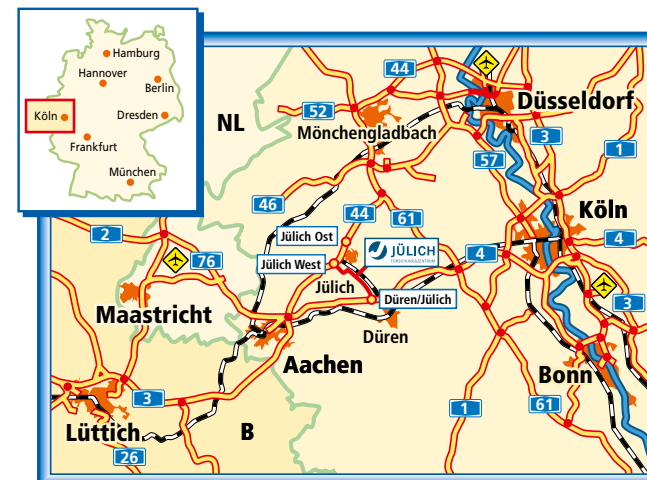
Doubleroom: € 89.00 per night incl. breakfast buffet and VAT

Please book your hotel room directly online at the conference webpage <http://www.fz-juelich.de/conference/wsp12>

Early reservation is recommended. The blocks of hotel rooms will be held until 14<sup>th</sup> September 2011. After this date reservations will be accepted on a space available basis.

**A shuttle service will be provided from Hotel IBIS Marschierort Aachen to the conference venue.**

## How to reach us:



Forschungszentrum Jülich is situated southeast of Jülich and is clearly signposted on all access roads.

[http://www.fz-juelich.de/portal/EN/Service/Howtoreachus/\\_node.html](http://www.fz-juelich.de/portal/EN/Service/Howtoreachus/_node.html)

## Further Information

### Symposium Committee

Prof. Dr. Detlev Stöver | Prof. Dr. Lorenz Singheiser | Dr. Stefan Baumann | Dr. Hans-Peter Buchkremer | Dr. Wilhelm Meulenberg

Online forms for registration, payment and additional information are available at our website:

<http://www.fz-juelich.de/conference/wsp12>

### or contact the conference service

Forschungszentrum Jülich GmbH

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## 12. Jülicher Werkstoffsymposium

Gas Separation Membranes for Zero-Emission Fossil Power Plants  
5<sup>th</sup> – 6<sup>th</sup> October 2011

Final Colloquium Helmholtz Alliance MEM-BRAIN

## Invitation and Registration

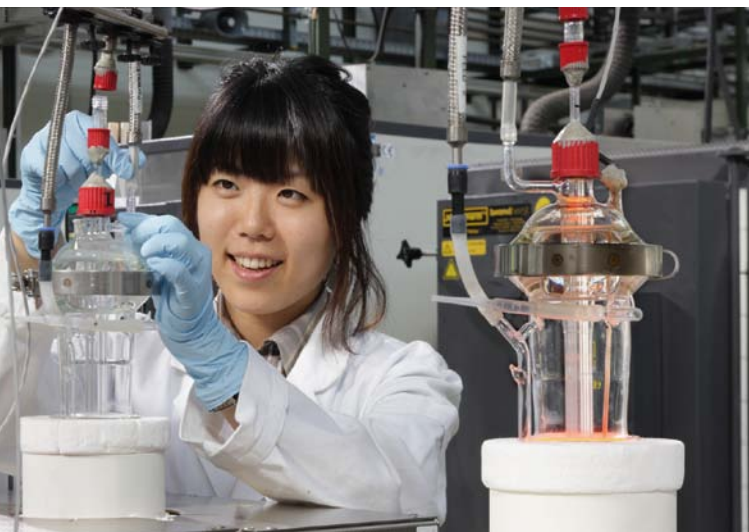
## Gas Separation Membranes for Zero-emission Fossil Power Plants

The reduction or avoidance of CO<sub>2</sub> emissions, particularly those from fossil power plants, is a major target in the present socio-economic, environmental and political situation. This target could be achieved by introducing gas separation techniques using membranes. The technology is associated with significantly lower efficiency losses compared with conventional separation technologies.

Membranes will enable the separation of the technically relevant gases, O<sub>2</sub>/N<sub>2</sub>, H<sub>2</sub>/CO<sub>2</sub> and CO<sub>2</sub>/N<sub>2</sub>, in the various power plant concepts in order to achieve the purest possible exhaust gas stream of the greenhouse gas CO<sub>2</sub>.

Although membranes are already used for substance separation in other fields (e.g. chemical industry), membranes for separating the technically relevant gases in fossil power plants are still far from ready for implementation in industrial applications.

The symposium will outline the state of the art of promising membrane materials, manufacturing routes, membrane properties and characterisation, as well as the possible implementation of membranes for gas separation in new fossil power plant concepts.



## Programme

### Wednesday, 5<sup>th</sup> October 2011

- 11:00 – 13:00 **Registration & Lunch**  
 13:30 – 13:40 **Welcome**  
*D. Stöver – Forschungszentrum Jülich GmbH (D)*
- 13:40 – 14:00 **Introduction and Overview**  
*W. A. Meulenbergh – Forschungszentrum Jülich GmbH (D)*

#### Session 1: Power plant concepts with integrated CCS and Systems Analyses

Chairman: Prof. Singheiser, Forschungszentrum Jülich GmbH (D)

- 14:00 – 14:20 **Single and multi-stage membrane options for Post-combustion**  
*L. Zhao, E. Riensche, M. Weber – Forschungszentrum Jülich GmbH (D)*
- 14:20 – 14:40 **Pre-combustion capture: General concept, evaluation of membranes**  
*J. Franz, V. Scherer – Ruhr University Bochum (D)*
- 14:40 – 15:00 **Oxyfuel combustion by means of high-temperature membranes**  
*M. Modigell, F. Beggel – RWTH Aachen University (D)*
- 15:00 – 15:20 **Energy systems analysis of CCS**  
*P. Zapp, A. Schreiber, P. Markewitz, D. Martinsen, J. Marx – Forschungszentrum Jülich GmbH (D)*
- 15:20 – 15:40 **Post-combustion Screening LCA**  
*H. J. Wagner, S. Troy – Ruhr University Bochum (D)*
- 15:40 – 16:10 **Coffee break**

#### Session 2: Polymer membranes and module concepts

Chairman: Prof. Klassen, Helmholtz Forschungszentrum Geesthacht (D)

- 16:10 – 16:30 **Design of CO<sub>2</sub>-selective polymeric membranes**  
*D. Fritsch W. – Helmholtz-Zentrum Geesthacht (D)*
- 16:30 – 16:50 **High water vapor flux through polymeric membranes and the consequences for module & process design**  
*R. Pauls – Helmholtz-Zentrum Geesthacht (D)*
- 16:50 – 17:10 **Characterisation of polymer membranes**  
*S. Funari – Deutsches Elektronen Synchrotron (D)*
- 17:30 **Dinner at Seecasino**

### Thursday, 6<sup>th</sup> October 2011

#### Session 3: Inorganic membranes (Part 1)

Chairman: Dr. Voigt, Fraunhofer Institute for Ceramic Technologies and Systems IKTS (D)

- 08:30 – 08:50 **Microporous membranes for hydrogen separation: State of the art and future prospects**  
*T. Van Gestel, M. Bram, W. A. Meulenbergh – Forschungszentrum Jülich GmbH (D); P. Puhlfürb, H. Richter, I. Voigt – Fraunhofer Institute for Ceramic Technologies and Systems IKTS (D); M.J. Wolf, H.J.M. Bouwmeester – University of Twente (NL)*
- 08:50 – 09:10 **Zeolite membranes for hydrogen separation**  
*H. Richter, Ch. Günther, I. Voigt – Fraunhofer Institute for Ceramic Technologies and Systems IKTS (D)*
- 09:10 – 09:30 **Ab initio calculations on membrane materials**  
*R. Dronskowski, M. Lumeij – RWTH Aachen University (D)*
- 09:30 – 09:50 **MIEC materials for oxygen separation – Transport properties and chemical stability**  
*M. Schroeder, S. Engels – RWTH Aachen University (D); S. Baumann, T. Markus – Forschungszentrum Jülich GmbH (D); R. Kriegel – Fraunhofer Institute for Ceramic Technologies and Systems IKTS*
- 09:50 – 10:10 **Electrochemical properties and stability of MIEC membrane materials**  
*E. Ivers-Tiffée, C. Niedrig, S. F. Wagner, A. Weber, A. Weber, C. Endler – Karlsruhe Institute of Technology (D)*
- 10:10 – 10:40 **Coffee break**

#### Session 3: Inorganic membranes (Part 2)

Chairman: Dr. Steinbrech, Forschungszentrum Jülich GmbH (D)

- 10:40 – 11:00 **Ba<sub>0.5</sub>Sr<sub>0.5</sub>Co<sub>0.8</sub>Fe<sub>0.2</sub>O<sub>3-d</sub> perovskite-type oxide ceramic membranes for oxygen separation: status and challenges**  
*H. J. M. Bouwmeester – University of Twente (NL)*
- 11:00 – 11:20 **Thermomechanical behavior of MIEC gas separation membranes**  
*J. Malzbender, B. Rutkowski, B. Huang, R.W. Steinbrech, T. Beck, L. Singheiser – Forschungszentrum Jülich GmbH (D)*

- 11:20 – 11:40 **Manufacturing and stability issues of ceramic proton conducting membranes**  
*J. M. Serra, S. Escolástico – Consejo Superior de Investigaciones Científicas (E); M. Ivanova, W. A. Meulenbergh, J. Seeger – Forschungszentrum Jülich GmbH (D)*
- 11:40 – 12:00 **Characterization of ceramic membranes by the use of neutrons and X-rays**  
*T. Scherb, G. Schumacher – Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (D)*
- 12:00 – 12:20 **Characterization of oxidic membranes by high-resolution TEM**  
*S. Roitsch, J. Barthel, J. Mayer – Ernst Ruska-Centre (D)*
- 12:20 – 13:40 **Buffet lunch**

#### Session 4: Manufacturing of inorganic gas separation membranes and modules

Chairman: H. J. M. Bouwmeester – University of Twente (NL)

- 13:40 – 14:00 **Processing and properties of asymmetric oxygen transport membranes**  
*W. A. Meulenbergh, S. Baumann – Forschungszentrum Jülich GmbH (D); J. M. Serra – Consejo Superior de Investigaciones Científicas (E); R. Kriegel – Fraunhofer Institute for Ceramic Technologies and Systems IKTS (D)*
- 14:00 – 14:20 **Metal-supported oxygen transport membranes (MIEC)**  
*S. Baumann, Y. Xing, W. A. Meulenbergh – Forschungszentrum Jülich GmbH (D); Matthias Rüttinger – Plansee SE (AUT)*
- 14:20 – 14:40 **Manufacturing of hollow fibres for gas separation**  
*V. Middelkoop, C. Buysse, A. Buekenhoudt, F. Sniijkers – Flemish Institute for Technological Research (B)*
- 14:40 – 15:00 **Demonstration of oxygen separation with BSCF membranes**  
*R. Kriegel, I. Voigt – Fraunhofer Institute for Ceramic Technologies and Systems IKTS*
- 15:00 – 15:20 **Permeation studies on composite membranes in lab-scale test cells – Design considerations and data evaluation**  
*R. Dittmeyer – Karlsruhe Institute of Technology (D)*
- 15:20 **Closing Remarks**  
*L. Singheiser (FZI)*