

*Program*

**Advanced Membrane Technology IV:  
Membranes for Clean and Sustainable  
Processes**

**June 7-12, 2009  
Trondheim, Norway**

**Conference Chair**

**Prof. May-Britt Hägg**  
Department of Chemical Engineering  
Norwegian University of Science and Technology



**Engineering Conferences International**

**32 Broadway, Suite 314**

**New York, NY 10004, USA**

**Phone: 1-212-514-6760, Fax: 1-212-514-6030**

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<b>Sunday June 7<sup>th</sup></b>	17:00-18:30 <i>Registration</i>	Hotel Britannia
	19:00- 19:30	<i>Concert in the Nidaros Cathedral</i>  (The cathedral is open from 18:45)
	19:45- 21:00	<i>Reception; Town Hall – Storsalen</i>
<b>Notes</b>		
<ul style="list-style-type: none"> <li>• Dinner on Tuesday night is "on your own"</li> <li>• Audiotaping, videotaping and photography of presentations are strictly prohibited.</li> <li>• Speakers – Please leave at least 5 minutes for questions and discussion.</li> <li>• Please do not smoke at any conference functions.</li> <li>• Turn your cellular telephones to vibrate or off during technical sessions.</li> <li>• Be sure to make any corrections to your name/contact information on the Master Participant List or confirm that the listing is correct. A corrected copy will be sent to all participants after the conference.</li> </ul>		
<b>Monday June 8<sup>th</sup></b>	08:00- 08:30 <i>Registration</i>	Hotel Britannia
08:30 – 09:00	<b>Welcome and opening remarks</b>	
	May-Britt Hägg, NTNU	Conference Chair
	Norman N. Li, ECI	Technical Liaison
09:00-10:00	<b>Plenary Lecture</b> Dr. Travis Bowen, principal scientist on membranes UOP R&D	<i>"Diversification of the world's energy sources and its challenges and opportunities to membrane applications".</i>
10:00 –10:30	<b>Coffee break</b>	
<b>Session I</b> 10:30 –12:30	<i>Session Co-Chairs:</i> Suzana Nunes, GKSS V. Khotimsky, TIPS-RAS	<b>Advancements in nanocomposite membranes</b>
	Suzana Nunes, GKSS	Functionalized organic-inorganic membranes for energy applications
	S. Matson, TIPS-RAS	Novel nanocomposite membrane materials on the basis of 1,2 disubstituted polyacetylenes with TiO <sub>2</sub>
	K. De Sitter, VITO – Flemish Inst. for Techn. Research	PTMSP for organophilic pervaporation: How does the incorporation of silica influences the performance?
	K. Gerstandt, Univ. of Kentucky	Electro osmosis and electrophoresis in doubled walled carbon nanotube membranes

12:30- 13:30	<b>Lunch</b>	
<b>Session II</b> 13:30- 17:30	<i>Session Co-Chairs:</i> B. Van der Bruggen, K.U. Leuven T-J Kim, NTNU	<b>Modelling and simulations</b>
	K.E. Colombo, NTNU	Integration of oxygen mixed conducting membranes into power plants
	A. Caravella, CNR-ITM (presenter: G. Barbieri)	Influence of the operating conditions on concentration polarization in Pd-based membranes
	M-O. Coppens, Rensselaer Polytechnic Institute	Molecular simulations of CO <sub>2</sub> and N <sub>2</sub> transport in ZSM-5-Zeolite membranes with framework substitutions
15:00-15:30	<b>Coffee Break</b>	
	S. Darvishmanesh, K.U. Leuven	Transport phenomena through solvent resistant nanofiltration
	Xuezhong He, NTNU	Using orthogonal experimental design for spinning defect-free hollow fiber membranes
	P. Luis, Univ. de Cantabria	Technical evaluation of a membrane-absorption process for sulphur dioxide recovery
18:30	<b>Leaving with tram and bus for dinner</b>	
19:00	<b>Buffet Dinner at Lian</b>	
<b>Tuesday June 9<sup>th</sup></b>		
<b>Session III</b> 08:30-12:30	<i>Session Co-Chairs:</i> D. Bhattacharyya; Univ. Kentucky M. Wessling, Univ. Twente	<b>Functionalized and Stimuli Membranes</b>
	M. Wessling, Univ. Twente	Functional particles in porous membranes
	Bruce Hinds, Univ. of KY	Aligned carbon nanotube membranes: Transport enhancement and gatekeeper activity
	K. Zodrow, Rice University	Metal/Metal oxide impregnated polysulfone membranes for virus removal in drinking water treatment
	Kamalesh K. Sirkar, N.J. Institute of Technology	Removal and recovery of solvents from fermentation broth by pervaporation and extractive pervaporation process using liquid membranes in novel HF substrates
10:30 – 11:00	<b>Coffee Break</b>	
	Isabel Escobar, Univ. of Toledo	Functionalization of ultrafiltration membranes for fouling control
	T. Schäfer, Univ. Rovira i Virgili	Exploring the potential of oligonucleic acids for designing stimuli responsive membranes

	M. Barboiu, Inst. European des Membranes	Dynamic-site complexant membranes: Toward and adaptive constitutional transport
12:30-13:30	<b>Lunch</b>	
<b>Session IV</b> 13:30-15:30	<i>Session Co-Chairs:</i> A. Hussain, NTNU T-N Nilsen, NTNU	<b>FO, PRO and Adsorptive Membranes-</b>
	T-S Chung, National Univ. of Singapore	Developing novel nanofiltration hollow fiber membrane in forward osmosis for seawater desalination and wastewater recovery
	S.E. Skilhagen, Statkraft	Osmotic Power – status of development
	Z. Borneman, Univ. Twente, EMI	Osmotic power for sustainable energy production
	Edvard Sivertsen, Sintef	Modelling hollow fibre modules for PRO power plants
15:30 –16:00	<b>Coffee break</b>	
<b>Session V</b> 16:00 – 17:30	<i>Session Co-Chairs:</i> TO Leiknes, NTNU JA Lie, NTNU	<b>Advanced Microfiltration and MBR</b>
	T. Leiknes, NTNU	What is MBR BAT? Advances and developments of MBR from an EU perspective
	D. Bhattacharyya, University of Kentucky	Polyelectrolyte Functionalized MF Membranes for Enzyme Reactions and Catalytic Nanoparticle Synthesis
	Thomas Meyn, NTNU	A coupled coagulation – ceramic microfiltration system for potable water production
17:30 – 19:00		<b>Poster Session A</b> (from sessions I – V)
19:00 →		Free Time
<b>Wednesday June 10<sup>th</sup></b>		
<b>Session VI</b> 08:30-12:00	<i>Session Co-Chairs:</i> G. Barbieri, ITM-CNR M. Sandru, NTNU	<b>Membrane Reactors for Clean Energy</b>
	A. Brunetti, ITM-CNR	The upgrading of a reformat stream in a Pd-Ag membrane reactor: CO inhibition effect on H <sub>2</sub> permeation
	S-H. Moon, Gwangju Inst. of Science and Technology	A novel polymer electrolyte membrane reinforced by electrospun nanofiber porous substrate for fuel cell applications
	A. Mejdell, StatoilHydro	Pd-based membrane in a microchannel configuration
10:00- 10:30	<b>Coffee Break</b>	
	E. Sheridan, Sintef Materials and Chemistry	Electrochemical purification and compression of hydrogen using (PBI fuel cell technology

	J.A. Lie, NTNU	Carbon membrane for biogas upgrading
11:30-12:30	<b>Lunch</b>	
12:45-20:00	<b>Tour with dinner</b>	<i>Visit Aqua Lyng and Kystens arv</i>
<b>Thursday June 11<sup>th</sup></b>		
<b>Session VII</b> 08:30- 14:30	<i>Session Co-Chairs: W.J. Koros, Georgia Tech M-B Hägg, NTNU</i>	<b>Membranes for CO<sub>2</sub> Capture</b>
	W.J. Koros, Georgia Inst. of Technology	Polymeric and hybrid membranes for aggressive CO <sub>2</sub> separation applications
	R. Bredesen, Sintef Materials & Chemistry	Development of thin Pd-23% Ag/stainless steel composite for application in water gas shift membrane reactors
	K. Fischbein, Univ. of Twente	High pressure CO <sub>2</sub> removal with polymerized room-temperature ionic liquids
10:00 - 10:30	<b>Coffee Break</b>	
	M. Huibers, KEMA	Ionomeric high voltage membranes (IHVM) – development and applications
	M-B Hägg, NTNU	Membranes for CO <sub>2</sub> capture in post combustion – a viable option?
	K. Nijmeijer, Univ. of Twente	Membranes for dehydration and CO <sub>2</sub> capture of flue gases
12:00-13:00	<b>Lunch</b>	
	H. Wijmans, MTR	An efficient membrane process to capture CO <sub>2</sub> from power plant flue gas
	S. Kazama, RITE	PAMAM Dendrimer Membrane for CO <sub>2</sub> /H <sub>2</sub> Separation from Pressurized Gas Stream
	M. Sandru, NTNU	Comparative study of composite PVAm membrane for CO <sub>2</sub> capture; flat sheet and hollow fibres porous support
	<i>Not yet decided on</i>	
14:30-16:00	<b>Coffee Break</b>	<b>Poster Session B (from sessions V – IX) and afternoon coffee</b>
19:00	<b>Banquet Dinner</b>	
<b>Friday June 12<sup>th</sup></b>		
<b>Session VIII</b> 09:00-10:00	<i>Session Co-Chairs: D. Paul, Univ. Texas L. Deng, NTNU</i>	<b>Novel Techniques for high flux membranes</b>
	D. Paul, Univ of Texas at Austin	High flux membranes: Properties of thin glassy polymer films
	I. Vankelecom, K.U. Leuven	High-throughput membrane synthesis and testing
<b>Session IX</b> 10:00-11:30	<i>Co-Chairs: E. Drioli, ITM-CNR N. Li, ECI-liaison</i>	<b>Advancements in Desalination and Nanofiltration</b>
	E. Drioli, ITM-CNR	Membrane systems for possible solutions to water stress



	B. Van der Bruggen, K.U. Leuven	Enhanced water recovery in wastewater treatment and desalination: An integrated approach based on RO and ED
	N. Li, NL Chemical Technology, Illinois	Advanced Reverse Osmosis for Industrial Applications
11:30	<b>Summing up &amp; Lunch</b>	
12:30-14:00		Optional tour / membrane laboratories at NTNU

## List of Posters

### Session A – Tuesday, June 9

1. USE OF LIGNOCELLULOSICS COMPONENTS OF SUGARCANE BAGASSE TO OBTAINING NANOCOMPOSED POLYMERIC MEMBRANES  
Adilson Roberto Gonçalves, Escola de Engenharia de Lorena – USP, Brazil
2. TRANSPORT PROPERTIES OF HYPERBRANCHED POLYIMIDES CONTAINING SILICA  
Petr Sysel, Institute of Chemical Technology Prague, Czech Republic
3. CROSSLINKING AND STABILIZATION OF NOVEL CARBON NANOTUBES FILLED PTMSP NANOCOMPOSITE MEMBRANES FOR GAS SEPARATION  
Lei Shao, NTNU, Norway
4. PREPARATION OF MIXED MATRIX GAS SEPARATION MEMBRANES BY IN-SITU POLYMERIZATION  
Tone Borge, NTNU, Norway
5. COUPLED SERIES-PARALLEL RESISTANT MODEL FOR TRANSPORT OF SOLVENT THROUGH INORGANIC NANOFILTRATION MEMBRANE  
Siavash Darvishmanesh, Katholieke Universiteit Leuven, Belgium
6. MECHANISM OF LIQUID MEMBRANE OSCILLATORS WITH IONIC SURFACTANTS  
Maria Szpakowska, Gdansk University of Technology, Poland
7. APPLICATION OF MEMBRANE PROCESSES IN THE PETROCHEMICAL INDUSTRY  
Tadeusz Porebski, Industrial Chemistry Research Institute, Poland
8. PREPARATION AND CHARACTERISATION OF NEW PHOTOGRAFTED THIN-LAYER COMPOSITE ULTRAFILTRATION MEMBRANES WITH ANTI-FOULING PROPERTIES  
Polina Peeva, University of Duisburg-Essen, Germany
9. REMOVAL OF TRICHLOROETHYLENE IN WATER BY MEANS OF PERVAPORATION  
Michal Bodzek, Silesian University of Technology, Poland
10. MECHANISM OF XENOESTROGENS REMOVAL FROM WATER ENVIRONMENT USING RO AND NF  
Michal Bodzek, Silesian University of Technology, Poland
11. STUDIES OF MEMBRANE FILTRATION COUPLED WITH THE MOVING-BED-BIOFILM REACTOR  
Igor Ivanovic, NTNU, Norway

## List of Posters

### Session B – Thursday, June 11

12. MASS TRANSPORT EFFECTS ON GAS ABSORPTION USING MICROPOROUS HOLLOW FIBER MEMBRANES  
Jung Hoon Park, Korea Institute of Energy Research, Korea
13. COBALT-FREE MIXED CONDUCTORS FOR OXYGEN SEPARATION  
Jung Hoon Park, Korea Institute of Energy Research (KIER), Korea
14. DENSE COMPOSITE MEMBRANE FOR PRODUCTION OF HYDROGEN WITH CARBON DIOXIDE SEQUESTRATION  
Jung Hoon Park, Korea Institute of Energy Research (KIER), Korea
15. REDUCTION OF CO<sub>2</sub> PRODUCTION IN A MEMBRANE DUAL-TYPE FISCHER-TROPSCH SYNTHESIS REACTOR LOOP  
Elahe Darzi, Shiraz University, Iran
16. GAS PERMEATION PROPERTIES OF METAL IONS EXCHANGED SULFONATED 6FDA-BASED POLYIMIDE MEMBRANES  
Ji Won Rhim, Hannam University, Korea
17. PREPARATION AND CHARACTERIZATION OF PVA<sub>M</sub>/PVA BLEND MEMBRANE FOR CO<sub>2</sub> CAPTURE  
Liyuan Deng, NTNU, Norway
18. CHALLENGES WITH RESPECT TO UP-SCALING FROM LAB. TO PILOT SCALE OF MEMBRANE PREPARATION AND SEPARATION PERFORMANCE - A CO<sub>2</sub> FACILITATED TRANSPORT MEMBRANE CASE  
Taek-Joong Kim, NTNU, Norway
19. CERAMIC TUBE SUPPORTED CARBON MEMBRANES DESIGNED FOR THE SEPARATION CO<sub>2</sub> FROM PRE-COMBUSTION GASES  
Qiang Yu, NTNU, Norway
20. USING ORTHOGONAL EXPERIMENTAL DESIGN FOR SPINNING DEFECT-FREE HOLLOW FIBER MEMBRANES  
Xuezhong He, NTNU, Norway