



האגודה הישראלית להנדסה כימית
Israel Institute of Chemical Engineers
Corresponding Member - European Federation of Chemical Engineers



Department of
Chemical Engineering
Technion-Israel Institute of Technology



Department of
Chemical Engineering
Ben-Gurion University of the Negev

EMCC-4
4th Chemical Engineering Conference
for Collaborative Research in
Mediterranean Countries

9-11 January 2006

Le Meridien Hotel, Dead Sea, Israel

CONFERENCE PROGRAM

Edited by:

G. S. Grader, E. Korin, D. R. Lewin and J. C. Merchuk

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Monday 9 January, Morning- Session 1				
08:30-09:00	OPENING SESSION Prof. Avishay Braverman, President, BGU Prof. Mina Teicher, Chief Scientist, Ministry of Science and Technology Dr. R. Wellek, NSF, USA Prof. M. Herskowitz, Vice President, BGU Chair: Prof. M. Shacham, National Organizing Committee			
09:00-09:50	PLENARY LECTURE Alexis T. Bell Identifying the structure and function of catalytically active sites through the application of experimental and theoretical methods			
09:50-10:20	Coffee Break			
Topic	<i>A</i> Advanced Materials and Nanotechnology	<i>M</i> Mini-Symposium	<i>C</i> Chemical Process Engineering	<i>D</i> Transport Phenomena & Separation Processes
Session title	Polymeric Materials	Mechanical Properties of Polymers and Polymer Nanocomposites	Reaction Engineering	Interface Phenomena and Polymers
Chair	G. Karakas G. Grader	A. Drozdov T. Elperin	C. Kiparissides, D. Levin	R. Yerushalmi-Rosen
10:20-11:00 Keynote 1	W.J. Koros, USA Pushing the state-of-the-art in membrane separations	M. Gelfer, USA Effects of temperature and matrix composition on the structure-rheology relations in polymer-organoclay nanocomposites	D. Luss, USA Hot zones formation in adiabatic packed-bed reactors	I. Szeleifer, USA Responsive polymer layers: Structure, thermodynamics, phase transition and protein adsorption
11:00-11:20 Lecture 1-I	C. Kiparissides, Greece Molecularly imprinted polymeric nanoparticles for selective recognition and separation	P. A. Kakavas, Greece Thermostatic behavior of elastomeric materials	M. Feinberg, USA Limits to productivity in reactor-separator systems with intricate chemistry	Y. Tsori, Israel Phase-separation in liquid mixtures induced by spatially nonhomogeneous forces
11:20-11:40 Lecture 1-II	A. Katz, USA (invited lecture) Functional hybrid organic-inorganic materials based on nanoscale templated active sites	A. D. Drozdov, Israel Elasticity of self-avoiding polymer chains	G. Barbieri, Italy Engineering approach for the WGS reaction in a catalytic membrane reactor	R. Stănescu, Romania Oxygen mass transfer in bubble columns in air-polyelectrolyte solutions in dilute regime
11:40-12:00 Lecture 1-III	H. Kalipcilar, Turkey Effect of batch composition on the morphology of MFI films synthesized in a continuous system	M. Itskov, Germany Constitutive modeling of anisotropic elastomers at large strains	A. Sesli, Turkey Fullerene production from cathodic deposits	T. Przybycien, USA (invited lecture) PEGylated protein adsorption behavior in hydrophobic chromatography and delivery depot environments
12:00-12:20 Lecture 1-IV	S. Srebnik, Israel Porous structure of molecularly imprinted polymers: Origin of poor imprinting		D. Fino, Italy Diesel emission control: Challenges in catalytic reaction engineering for particulate combustion	
12:20-14:00	Lunch			

Monday 9 January, Afternoon - Session 2				
Topic	<i>A</i> Advanced Materials and Nanotechnology	<i>B</i> Biological Engineering	<i>C</i> Chemical Process Engineering	<i>D</i> Transport Phenomena & Separation Processes
Session title	Nanostructured Materials	Biomaterials	Engineering Science in PSE	Membranes I
Chair	A. Volceanov Y. Talmon	S. Cramer R. Azhari	P. Seferlis D. Luss	A. Payatakes
14:00-14:40 <i>Keynote 2</i>	Y. Cohen, Israel Composite polymer nanofibers containing carbon nanotubes: Processing, structure and functionality	S. Cohen, Israel "Designer" alginate biomaterial can repair and rejuvenate infarcted heart muscle	C. Kiparissides, Greece Solution of the bi-variate dynamic population balance equation in batch particulate systems	G. Belfort, USA Protein adhesion-resistant membranes and conformation changes
14:40-15:00 <i>Lecture 2-I</i>	I.E. Wachs, USA (invited lecture) Tuning the electronic and molecular structures of catalytic active sites with oxide support nanoligands	H. Bianco-Peled, Israel Algal polymers and their potential applications as biomedical adhesives	J. Merchuk, Israel The dancing algae: Photosynthesis and fluid dynamics	E. Curcio, Italy Improving and speeding up protein crystallization by using microporous hydrophobic membranes
15:00-15:20 <i>Lecture 2-II</i>	F. Balıkcı, Turkey Studies of pore structure, temperature-programmed reduction and desorption performance of the CeO ₂ supported silver and cobalt catalysts	S. Mallapragada, USA (invited lecture) Novel injectable self-assembling thermogelling systems for drug and gene delivery	D.L. Marchisio, Italy Effect of mixing on nano-flash precipitation: Experiments and simulations	C. Linder, Israel Development of charged composite nanofiltration membranes with controlled selectivity
15:20-15:40 <i>Lecture 2-III</i>	B. İkizler, Turkey Production of ZnO nanoparticles in microemulsions	A. Bertuccio, Italy Understanding the interactions between dense CO ₂ and microorganisms	B. Radoev, Bulgaria Dynamic behaviour and stability of thin liquid films	Y. Oren, Israel Heterogeneous ion exchange membranes with reduced percolation threshold for electrodialysis and fuel cells applications
15:40-16:00 Lecture 2-IV	O. Regev, Israel A simple route to the preparation of high aspect ratio cadmium sulfide nanostructures in aqueous solution	R. Azhari, Israel Targeted delivery of antigens to antigen presenting cells by gelatin-chondroitin sulfate microspheres	G. Saracco, Italy Noble metal amount decrease in catalytic converters for CNG vehicles	E. Lightfoot, USA (invited lecture) Membrane cascades for intensification of downstream processing
16:00-16:20 <i>Lecture 2-V</i>	A. Bertuccio, Italy Solvent-free production of lipid nanoparticles by high pressure CO ₂	R. Bitton, Israel Morphological characterization of self-assembled peptide nucleic acid amphiphiles	R. Slavchov, Bulgaria Equilibrium profile and rupture of wetting film on heterogeneous substrates	
16:20-17:00	<i>Coffee Break</i>			
17:00-19:30	<i>COLLABORATIVE RESEARCH</i> Workshops Chair: R. Semiat			
20:00-22:30	<i>Welcome Reception</i>			
	<i>Social Activities</i>			

Tuesday 10 January, Morning - Session 3				
09:00-09:50	PLENARY LECTURE Jonathan S. Dordick Controlling protein-surface interactions: from nanoscale architectures to drug discovery platforms			
09:50-10:20	<i>Coffee break</i>			
Topic	<i>A</i> Advanced Materials and Nanotechnology	<i>B</i> Biological Engineering	<i>C</i> Chemical Process Engineering	<i>D</i> Transport Phenomena & Separation Processes
Session title	Electronic & Ceramic Materials	Proteins/Modeling	Education	Heat Transfer & Fluid Flow
Chair	A Katz Y. Yurum	C. Kontoyannis H. Bianco-Peled	M. Camurdan M. Shacham	N. Brauner
10:20-11:00 <i>Keynote 3</i>	R.J. Gorte, USA Anodes for direct fuel utilization in solid oxide fuel cells	A.S. Bommarius, USA Tools for describing and overcoming stability limitations in proteins	W. D. Seider, USA Real-time risk assessment using Bayesian theory: Towards safer chemical operations	C. Amon, USA Thermal transport in nano-structured semiconductor materials and devices
11:00-11:20 <i>Lecture 3-I</i>	G.S. Grader, Israel Evolution of microstructure and electrical properties in sol-gel derived PZT films	C. Kontoyannis, Greece Using Raman spectroscopy for the study of biogenic materials	D. R. Lewin, Israel A course sequence for effective process design instruction	Y. Taitel, Israel Flow rate distribution in evaporating parallel pipes
11:20-11:40 <i>Lecture 3-II</i>	E. Volceanov, Romania Stabilized zirconia in MgO-CeO ₂ -ZrO ₂ system processed by powders solid state reactions and by chemical route	S. Cramer, USA (invited lecture) Prediction of protein affinity and displacer selectivity in chromatographic systems using state-of-the art structure-property multi-scale modeling techniques	M. Cutlip, USA (invited lecture) Combining numerical problem solving with on-line access to physical property data — a new paradigm in ChE education	Y. Yürekli, Turkey Predicting emission characteristics of volatile organic compounds from surface coatings
11:40-12:00 <i>Lecture 3-III</i>	Y. Tsur, Israel Formation of <i>pn</i> or <i>pin</i> junction in mixed ionic-electronic conductor as a result of oxygen activity gradient	G. Enden, Israel A mathematical description of viral dynamics	S. Gultekin, Turkey A search into the situation of mathematics courses in chemical engineering	N. Melnichanskaya, Israel Numerical investigation of Taylor bubbles motion in vertical pipes filled by viscous liquid
12:00-12:20 <i>Lecture 3-IV</i>	Y. Yürüm, Turkey Synthesis and characterization of mesoporous carbons using zeolitic templates and formation of organoaluminum fluoride structures	Ch. Boyadjiev, Bulgaria Hierarchical approach for parameter identification of bioengineering multi-parameter models	J.A. Trilleros, Spain The design and operation of airlift loop tanks by reverse flow	T. Elperin, Israel The study of solvable gas absorption by evaporating/growing droplets: Environment and engineering aspects
12:25-14:00	Lunch			

Tuesday 10 January, Afternoon - Session 4				
Topic	<i>A</i> Advanced Materials and Nanotechnology	<i>B</i> Biological Engineering	<i>C</i> Chemical Process Engineering	<i>D</i> Transport Phenomena & Separation Processes
Session title	Functional Catalytic Materials	Genetic Engineering	Environmental Engineering & Safety	Membranes II & Separation
Chair	M. Herskowitz I.E. Wachs	W. S. Hu M. Camurdan	A. Bertucco	E. Curcio
14:00-14:40 Keynote 4	Y. Yürüm, Turkey Synthesis and characterization of metal based catalysts for carbon nanofiber and nanotube production	F. Srienc, USA Rational metabolic engineering: Design and construction of most efficient microorganisms	L. Pellegrini, Italy Batch reacting systems: on-line runaway detection	E. Drioli, Italy Membrane unit operations integrated in the ethylene cycle. Toward process intensification in ethylene production
14:40-15:00 Lecture 4-I	M. Landau, Israel Alumina foam coated with nanostructured chromia aerogel - efficient catalytic material for complete combustion of chlorinated VOC	N. Brenner, Israel A population view of gene regulation	F. Balıkcı, Turkey Selective carbon monoxide oxidation from hydrogen-rich stream by the 5% CuO/CeO ₂ catalysts	V. Freger, Israel The role of molecular interaction in removal of organics by RO and NF composite membranes
15:00-15:20 Lecture 4-II	G. Karakas, Turkey Activity of potassium and palladium promoted tin oxide in CO oxidation	T.H. Özdamar, Turkey Strategy development for l-phenylalanine production by reaction- and metabolic-engineering principles	R. Zukerman, Israel Modeling and simulation of a smart catalytic converter for a lean burn engine	A. Drak, Israel Application of residence time distribution techniques for characterizing flow patterns of RO spiral wound modules
15:20-15:40 Lecture 4-III	M. Amiridis, USA (invited lecture) Development of supported catalysts from metal dendrimer nanocomposite precursors	M. Camurdan, Turkey Investigation of solvent effect on protein dynamics by using stochastic time series	E. Sulman, Russia Physico-chemical and biotechnological methodology for waste water treatment from phenol pollutions	S. Simakov, Israel Membrane reactor design for thermally balanced hydrogen production
15:40-16:00 Lecture 4-IV	M. Abecassis-Wolfovich, Israel High-performance solid Mn-Ce nanocatalyst for low temperature wet oxidation of organic pollutants in industrial wastewater	W. -Sh. Hu, USA (invited lecture) Unveiling the regulation of secondary metabolism in Streptomyces	Y. Raichman, Israel Understanding the nature of interparticle bonds in agglomerates	Y. Cohen, USA (invited lecture) High recovery RO desalination fluid dynamics
16:00-16:20 Lecture 4-V	I. Efremenko, Israel Theoretical prediction of adsorption properties of carbon materials	G. Sotiropoulou, Greece Epigenetic silencing of human kallikrein 6 gene suggests a suppressor role in breast cancer		
16:20-17:00	Coffee Break			
17:00-18:30	POSTER FORUM Chair: F. Srienc & M. Cutlip			
18:30-20:00	POSTER SESSION Chair: C. Boyadjiev			
20:30-22:30	Gala Dinner, After Dinner Presentation by Y. Shahar			

Wednesday 11 January, Morning - Session 5				
09:00-09:50	PLENARY LECTURE Nicholas L. Abbott Spatial and temporal control over the self-assembly of surfactants			
09:50-10:20	Coffee Break			
Topic	A Advanced Materials and Nanotechnology	B Biological Engineering	C Chemical Process Engineering	D Transport Phenomena & Separation Processes
Session title	Materials Synthesis & Characterization	Transport & Delivery	Process Systems Engineering	Environmental Engineering
Chair	M. Amiridis Y. Tsur	S. Mallapragada A. Bertucco	M. Cutlip	R. Stănescu
10:20-11:00 Keynote 5	M. M. Denn, USA Orientation transitions in liquid crystalline droplets	D.S. Rumschitzki, USA Transport in vessel walls: Why some vessels get atherosclerosis and others don't	J. L. Hudson, USA Sudden onset of pitting corrosion on stainless steel as a critical phenomenon	R. Semiat, Israel Aspects of heat and mass transfer in desalination
11:00-11:20 Lecture 5-I	Y. Talmon, Israel Cryo-TEM characterization of nano-aggregates in the liquid phase: State of the technology	A. Shroeder, Israel Controlled release of drugs from liposomes using low-frequency ultrasound	P. Seferlis, Greece A model-predictive control strategy for optimal inventory and pricing policies in supply chain networks	A. Pagana, Greece Removal of arsenic from water by iron oxide nanoparticles and nanofiltration ceramic membranes
11:20-11:40 Lecture 5-II	Ș. Motoc, Romania Mechanical properties and impact resistance of alumina matrix composites	M.G. Sul'man, Russia Using of the ultrasound for controlled drug delivery system creation	M. Shacham, Israel Using the similarity between molecular structures for property prediction	G. Burtica, Romania Separation of dyes from simulated wastewater using ELM processes Transport of reactive dyes through emulsion liquid membrane
11:40-12:00 Lecture 5-III	V. Tsakaloudi, Greece The effect of Cu-substitution in the properties of polycrystalline magnetic materials of the general formula (Cu-Ni-Zn)Fe ₂ O ₄	M. Haber, Israel Polymeric films for oral administration of bioactive substances	E. Dassau, Israel Improved yield in bioprocessing through integrated design and control	D. Zinemanas, Israel A study of flow assisted corrosion cases in IEC
12:00-12:20 Lecture 5-IV	D.G. Kanellopoulou, Greece In vitro studies for the simulation of biological mineralization	C. Gaidau, Romania Leathers and fur skins – reliable biomaterials for medical use		B. Ovez, Turkey Metal toxicity determination using cress seed in phosphate contaminated aqueous media
12:20-13:00	CONCLUDING SESSION & FAREWELL			
13:00-14:00	Lunch			

POSTER FORUM

Advanced materials and nanotechnology

- PF-A1 **Activation of supported metal catalysts via decomposition and removal of dendrimer ligands**
(USA)
D. Deutsch, A. Siani, C. Williams, and M. Amiridis
- PF-A2 **Metal and metal oxide incorporated MCM-41 type mesoporous materials and their catalytic applications**
(Turkey)
Timur Dogu, Yesim Gucbilmez, Canan Sener, Asli Nalbant, Suna Balci,,
Gulsen Dogu
- PF-A3 **Selective oxidation of H₂S to elemental sulfur over mixed metal oxide catalysts**
(Turkey)
Gulsen Dogu, Sena Yasyerli, Timur Dogu
- PF-A4 **New ester-imide oligomers with improved processing for H class insulators**
(Romania)
Minodora Leca
- PF-A5 **Support-supported oxide interaction evaluated by ac electrical conductivity/capacity measurements in operando conditions**
(Romania)
M Caldararu, C.Munteanu, M.Carata, C.Hornoiu, P.Chesler, R.Picu, G.Postole,
K.Sohlberg
- PF-A6 **Impedance spectroscopy: General approach**
(Israel)
S. Baltianski
- PF-A7 **Stress-adaptive nanocrystalline materials**
(Israel)
M. Ram, I. Lubomirsky and Y. Tsur
- PF-A8 **The influence of a Pbtio3 seed layer on the properties of 53/47 Pzt**
(Israel)
M. Kabla, G. E. Shter, G. S. Grader
- PF-A9 **Examination of a new method for the analysis of impedance spectroscopy data using measurments on Nb doped barium titanate**
(Israel)
S. Hershkovitz, S. Baltianski and Y. Tsur
- PF-A10 **The effect of Cu-substitution in the properties of polycrystalline magnetic materials of the general formula (Cu_xNiy_{-δ}Zn_y) Fe₂O₄ (x+y=1, δ=0-0.22)**
(Greece)
I. Skouloudi, K. Michelakou, A. Delimitis, V. Tsakaloudi, V. Zaspalis
- PF-A11 **Raman spectroscopy: A tool for the characterization of plant mineral deposits**
(Greece)
M. Orkoula, A. Dimitrakopoulou, M. Katri, C. Kontoyannis., D. Nikolopoulos, G. Tooulakou, V. Lourida, G. Karabourniotis
- PF-A12 **Mineral precipitation for the controlled consolidation of granular media and stabilization of loose sandy soils**
(Greece)
M. G. Lioliou, A. N. Kofina ,T. Larse, C. A. Paraskeva, P. G. Klepetsanis,
P. G. Koutsoukos , T. Østvold, A. C. Payatakes

- PF-A13 **Influence of precursor materials on ZTA composites characteristics**
(Romania)
S. Motoc, E. Volceanov , A. T. Abagiu, A. Volceanov, P. Nita
- PF-A14 **Support-supported oxide interaction evaluated by ac electrical conductivity/capacity measurements in operando conditions.**
(Romania)
M Caldararu, C.Munteanu, M.Carata C.Hornoiu, P.Chesler, R.Picu, G.Postol, K.Sohlberg
- PF-A15 **Preparation and characterization of glass fiber / poly(ethylene terephthalate) composites**
(Turkey)
G. Bayram. C. Altan
- PF-A16 **Synthesis and characterization of mesoporous carbons using natural zeolite as a template**
(Turkey)
B. Sakintuna and Y. Yürüm

Biological engineering

- PF-B1 **Structure and properties of polyethylene glycol based biosynthetic scaffolds for tissue engineering**
(Israel)
I. Frisman, H. Bianco-Peled, D. Divovsky & D. Selictar
- PF-B2 **pH influences metabolite profiling of β -lactamase producing *Bacillus licheniformis***
(Turkey)
Nazar İleri, Pınar Çalık, Ali Şengül
- PF-B3 **Determination of metabolic bottlenecks using reaction engineering principles in serine alkaline protease production by recombinant *Bacillus* sp.**
(Turkey)
Pınar Çalık, Ilkin Ece Telli, Tunçer H. Özdamar
- PF-B4 **Strategy development for l-phenylalanine production by reaction- and metabolic-engineering principles**
(Turkey)
I. Ş. Özçelik, Y. Demirci, P. Çalık, G. Çalık, T. H. Özdamar

Chemical process engineering

- PF-C1 **A model of coagulation – flocculation process in turbulent flow**
(Romania)
Mihaela Mihai, Gabriel Dabija, Cristina Costache, Ionel Constantinescu, Rodica Stănescu
- PF-C2 **Methylation effect on the liquefaction of coal by using microwave energy**
(Turkey)
Yağmur, E., Engin, T.S. and Simsek, E.H.
- PF-C3 **A mathematical model for biomass photosynthesis in and inclined tube bioreactor**
R. Volinsky, D. Feuermann, I. Berzin J. C. Merchuk
- PF-C4 **Kinetics of vapor phase ETBE Production in the presence of acidic sulfonated ion exchange resins**
(Turkey)
Sen, N., Degörmencö, L., Oktar, N., Doğu, G.

PF-C5 **Alternative processes for hide liming and modern methods for assessing the environment impact**
(Romania)
Carmen Gaidau, Luminița Albu, Victoria Brătulescu, Lucreția Miu,
Maria Giurginca and Aurelia Meghea

Transport phenomena and separation processes

- PF-D1 **Chemical and mechanical aspects of cleaning of UF membranes**
(Israel)
V. Gitis
- PF-D2 **Copolyimide membrane for gas separation**
(Turkey)
O. O. Er, S. Sen, C. Atalay-Oral, F. S. Guner, S. B. Tantekin-Ersolmaz
- PF-D3 **Prevention of precipitation fouling in RO by reverse flow operation**
(Israel)
M. Milman, N. Pomerantz, Y. Ladizhansky, E. Korin, and J. Gilron
- PF-D4 **Separation of dyes from simulated wastewaters using film ELM processes**
Part II: Transport of direct dyes through emulsion liquid membrane
(Romania)
G. Burtica., S. Masu and F. Manea
- PF-D5 **Preparation & characterization of metallic nano particles in layer by layer (LBL) structures**
(Israel)
Y. Omer, E. Korin and A. Bettelheim
- PF-D6 **Catalytic reduction of oxygen by metalloporphyrins in fuel cell electrodes**
(Israel)
L. Elbaz, E. Korin, A. Bettelheim
- PF-D7 **Development of treatment techniques for process plant sewage drain with high alkali concentration**
(Israel)
S. Anker, J. Rinat, M. Saphie, D.Tavor
- PF-D8 **A model of the coagulation – flocculation process in turbulent flow**
(Romania)
M. Mihai, G. Dabija, C. Costache, I. Constantinescu, R. Stănescu.
- PF-D9 **Particle resuspension from surfaces: New developments 1995-2005**
(Israel)
G. Ziskind
- PF-D10 **Effect of drying conditions on biological activities of sulfated polysaccharide**
(Israel)
A. Ginzberg, E. Korin, S. (Malis) Arad