

## **Content**

### **VOLUME I**

#### **Combustion & Flames**

<b>CHEMICAL AND THERMAL EFFECTS OF CO<sub>2</sub> ADDITION IN FUEL-RICH PREMIXED ETHYLENE FLAMES</b>	<b>1</b>
S. Mancarella, A. Sully, M. Derudi, R. Rota, S. Granata, T. Faravelli and E. Ranzi	
<b>LES MODELLING OF OBSTACLES-ACCELERATED PREMIXED FLAMES</b>	<b>7</b>
V. Di Sarli, A. Di Benedetto and G. Russo	
<b>STOICHIOMETRIC NETWORK ANALYSIS OF DYNAMICS OF CATALYTIC OXIDATION OF CO AND HYDROCARBONS</b>	<b>15</b>
O. Hadac, M. Kohout, I. Schreiber, M. Marek and M. Kubicek	
<b>CARBON FORMATION IN THE STEAM REFORMING PROCESS: A THERMODYNAMIC ANALYSIS BASED ON THE ELEMENTAL COMPOSITION</b>	<b>21</b>
M.C. Annesini, V. Piemonte and L. Turchetti	
<b>IMPROVEMENTS IN THE SIMULATION OF LIQUID FUEL COMBUSTION IN A LOW-TEMPERATURE FLUIDIZED BED</b>	<b>27</b>
M. Miccio, L. Ferrante, T. Faravelli, A. Frassoldati and E. Ranzi	

#### **Advanced Design and Simulation**

<b>MODERN DESIGN OF ELECTROCHEMICAL REACTORS</b>	<b>33</b>
A. Ottaviani	
<b>IMPORTANCE OF ISOPARAFFINS IN THE CRUDE OIL REFINING INDUSTRY</b>	<b>41</b>
J. Hancsok, S. Magyar and A. Hollo	
<b>THE INTEGRATED SIMULATION AND OPTIMIZATION FOR ABSORPTION-STABILIZATION SYSTEM AND GAS PROCESSING UNIT</b>	<b>47</b>
E. Lu, M. Luo and H. Zhang	
<b>EXPERIMENTATION, MODELLING AND OPTIMISATION OF OXIDATIVE DESULPHURIZATION OF HEAVY GAS OIL: ENERGY CONSUMPTION AND RECOVERY ISSUES</b>	<b>53</b>
H. Khalfalla, I. Mujtaba, M. Elgarni and H. El Akrami	
<b>AN EFFICIENT REPLACEMENT OF THREE PIECES OF EQUIPMENT WITH A SINGLE ONE. A CASE STUDY IN A PHARMACEUTICAL FACTORY</b>	<b>59</b>
R. Lauri, L.G. Luccone and G. Mari	

## Precipitation & Nano Particles

DEVELOPMENTS IN PRECIPITATION ENGINEERING FOR THE PROCESS INTENSIFICATION IN THE ENVIRONMENTAL PROTECTION AND OTHER PURIFICATION INDUSTRIAL ACTIVITIES	65
E. Plasari and H. Muhr	
PRODUCTION OF NANOPARTICLES OF TITANIUM DIOXIDE BY USING A SPINNING DISC REACTOR	71
M. Stoller, M. Mescia, Valencia Peroni and A. Chianese	
PREPARATION AND CHEMICAL DEPOSITION OF PURE AND DOPED TIO <sub>2</sub> SOLS: APPLICATION TO NANOCOATINGS FOR REACTIVE GAS CLEANING	77
R. Azouani, L. Mokrani, M. Benmami, K. Chhor, J.F. Bocquet, J.L. Vignes and A. Kanaev	
SOL-GEL SYNTHESIS OF SILICON-COBALT MIXED OXIDE	83
NANOCOMPOSITES	
S. Esposito, S. Dal Vecchio, G. Ramis, M. Bevilacqua, M. Turco, G. Bagnasco, C. Cammarano, A. Aronne and P. Pernice	
NEW MATERIALS FROM MULTISCALE MODELLING PROCEDURES: PROPERTIES PREDICTION AND CUSTOMISATION OF POLYMERIC NANOCOMPOSITES	89
P. Cosoli, M. Fermeglia, M. Ferrone, P. Posocco, S. Pricl and G. Scocchi	

## Numerical Tools & Procedures

OPTIMIZATION OF POWER TRANSFORMATIONS IN GLOBAL OPTIMIZATION	95
A. Lundell and T. Westerlund	
AN INTEGRATED MODEL-CENTRIC FRAMEWORK FOR JOINT PARAMETER ESTIMATION/DATA RECONCILIATION OF PROCESS SYSTEMS	101
D. Aragon, P.A. Rolandi and J.A. Romagnoli	
AN INTERACTIVE OPTIMISATION TOOL FOR ALLOCATION PROBLEMS	107
F. Bonas, J. Westerlund and T. Westerlund	
OBJECT ORIENTED MODELLING APPLIED TO HYBRID UNIT OPERATIONS	113
P. Greppi, B. Bosio and E. Arato	
A CLASSIFICATION OF NONLINEAR SYSTEMS: AN ENTROPY-BASED APPROACH	119
A. Balestrino, A. Caiti and E. Crisostomi	
COMPARISON OF SOME HIGH-PERFORMANCE MINLP SOLVERS	125
T. Lastusilta, M. Bussieck and T. Westerlund	

**INFORMATION MODEL AND TECHNOLOGICAL INFORMATION - 131  
INFRASTRUCTURE FOR PLANT LIFE CYCLE ENGINEERING**

Y. Naka, H. Seki, S. Hoshino and K. Kawamura

**OPTIMIZATION OF PROCESS PLANT LAYOUT USING A QUADRATIC 137  
ASSIGNMENT PROBLEM MODEL**

S. Franceira, S.S. De Almeida and R. Guirardello

#### **Crystallization & Particles Identification**

**ZLD EVAPORATION-CRYSTALLIZATION PLANT IN THE 143  
HYDROMETALLURGICAL INDUSTRY**

C. Melches, G. Hofmann, F. Paroli and H. Plate

**HYBRID CFD-MULTIZONAL MODELLING OF POLYMORPHS AND 149  
AGGLOMERATION PHENOMENA IN CRYSTALLISATION PROCESSES**

S.K. Birmingham, S. Trivellato, M. Vernier and F. Bezzo

**CRYSTALLIZATION OF PC AND PEEK WITH SUPERCRITICAL CARBON 155  
DIOXIDE**

S. Bologna, G. Del Re, L. Mascia and G. Spagnoli

**OPTIMAL CONTROL OF PARTICLE SIZE IN ANTISOLVENT 161  
CRYSTALLIZATION OPERATIONS**

S.M. Nowee, A. Abbas and J.A. Romagnoli

**SEPARATING TOUCHING AND OVERLAPPING OBJECTS IN PARTICLE 167  
IMAGES - A COMBINED APPROACH**

J. Korath, A. Abbas and J.A. Romagnoli

#### **Waste Recovery**

**RECOVERY OF ZINC AND MANGANESE FROM SPENT BATTERIES BY 173  
DIFFERENT LEACHING SYSTEMS**

F. Pagnanelli, G. Furlani, F. Ferella, I. De Michelis, F. Beolchini, F. Veglio and L. Toro

**RECOVERY OF CHROMIUM (III) BY POLYMER ENHANCED 179  
ULTRAFILTRATION**

M.S. Khaidar, J. Labanda and J. Llorens

**POLYPHENOLS RECOVERY FROM WASTEWATER BY ADSORPTION ON 185  
POLYMERIC RESINS**

M. Parisi, A. Festuccia and A. Chianese

**REMOVAL OF NICKEL IONS FROM AQUEOUS SOLUTION ON PACKED 191  
BEDS OF ZEOLITE NAX**

D. Kumar, S.S. Sambi, S. Sharma and V. Kumar

**INVESTIGATION ON THE REMOVAL MECHANISMS OF ORGANIC 199  
MICROPOLLUTANTS IN ACTIVATED SLUDGE PROCESSES**

D. Dionisi, M. Beccari, M. Majone and L. Bornoroni

**Waste Analysis**

**ODOUR IMPACT DETERMINATION OF A MSW TREATMENT PLANT: 205  
DISPERSION MODELLING AND ELECTRONIC NOSE**

S. Sironi, L. Capelli, P. Centola, R. Del Rosso and M. Il Grande

**A LYSIMETER STATION FOR CONTAMINATED SOIL STUDIES 211**

G. Toscano, M.L. Colarieti and G. Greco

**SEASONAL VARIABILITY OF SVI IN THE SECONDARY SEDIMENTER OF 217  
AN ITALIAN WWTP**

P. Traverso, D. Zanchettin, A. Ghermandi, F. Busetti and S. Badoer

**CAPE OPEN**

**EXPANDING THE CAPE-OPEN THERMODYNAMIC INTERFACES: VERSION 1.1 223**

M. Pons

**PROSIMPLUS: NEW CAPE-OPEN CAPABILITIES 229**

P. Guittard, A. Vacher, S. Dechelotte and O. Baudouin

**CAPE OPEN INTERFACE REVISITED IN TERM OF CLASS-BASED 235  
FRAMEWORK: AN IMPLEMENTATION IN .NET.**

M. Fermeglia and M. Parenzan

**Dynamics & Control**

**CLUSTER ANALYSIS IN PROCESS AND ENVIRONMENTAL MONITORING 241**

S. Beaver, A. Palazoglu and J.A. Romagnoli

**DYNAMIC PARAMETER ESTIMATION PROBLEM FOR A WATER QUALITY 247  
MODEL**

V. Estrada, E. Parodi and S. Diaz

**TIME-OPTIMAL CONTROL OF DISTILLATION COLUMNS BY ITERATIVE 253  
DYNAMIC PROGRAMMING**

A. Woinaroschy

**CONTROLLING AEROSOL PROCESSES FOR SYNTHESIS OF CERAMIC 259  
POWDERS**

F. Manenti, G. Manenti and M. Masi

<b>RAMAN SPECTROSCOPY FOR PROCESS CONTROL IN CHEMICAL AND PHARMACEUTICAL MANUFACTURING</b>	265
B. Lenain, H. Lucas, C. Uerpmann, K.L. Davis, M.A. Ehly, M. Kemper and I. Lewis	
<b>DYNAMICS OF DOUBLE PIPE HEAT EXCHANGERS: EXPLICIT TIME DOMAIN SOLUTIONS</b>	271
F. Evangelista	
<b>OPTIMAL OPERATIONAL CONDITIONS OF EMULSION POLYMERIZATION PROCESS USING AN INVERSE NEURAL NETWORK MODEL</b>	279
S. Contant and L. Lona	
<b>SPATIO-TEMPORAL PATTERNS IN LOOP REACTORS WITH DIFFERENT SWITCH STRATEGIES</b>	285
L. Russo, E. Mancusi, P. Altomari, P.L. Maffettone and S. Crescitelli	
<b>DYNAMIC MODELING AND SIMULATION TO OVERCOME THE INITIALIZATION PROBLEM IN STEADY STATE SIMULATIONS OF DISTILLATION COLUMNS</b>	291
I. Dones and H. Preisig	

### **Modeling & Simulation of Fluid Dynamics Phenomena**

<b>MODELING AND SIMULATION TO MATERIAL DEVELOPMENT FOR RAPID PROTOTYPING PROCESS</b>	297
A.L. Jardini, M.C.B. Costa, R. Rezende, S.R. Andrade and R. Maciel Filho	
<b>NUMERICAL SIMULATIONS OF BUBBLING FLUIDIZED BEDS</b>	303
A. Busciglio, G. Micale, L. Rizzuti and G. Vella	
<b>PARTICLE MIGRATION IN A STIRRED VESSEL AT LOW REYNOLDS NUMBERS</b>	309
N. Nishioka, Y. Tago, T. Takigawa, M.N. Noui-Mehidi, J. Wu and N. Ohmura	
<b>A CONTINUOUS MODEL OF A ROTATING DISC COLUMN FOR GLYCEROL RECOVERY IN SOAP PRODUCTION</b>	315
G. Bozzano and M. Dente	
<b>GAS-LIQUID TWO-PHASE FLOW IN A TAYLOR VORTEX FLOW REACTOR</b>	321
K. Yamawaki, H. Hosoi, T. Takigawa, M.N. Noui-Mehidi and N. Ohmura	
<b>SCALING UP CONTINUOUS MIXING PROCESS OF LIQUID LAUNDRY ADDITIVES MADE UP OF SELF THICKENING SURFACTANTS SOLUTIONS</b>	327
V. Guida	
<b>OPTICAL BUBBLE DETECTION SYSTEM FOR CHEMICAL INDUSTRY PIPELINES</b>	333
A.M. Frattini Fileti, F. Delatore and J. Pereira	

**THERMAL STUDY OF THE LAMINAR FLOW OF A BINGHAM PLASTIC IN A HORIZONTAL CIRCULAR PIPE MAINTAINED AT UNIFORM TEMPERATURE**

N. Labsi, A. Boutraa and Y.K. Benkahla

**ROLE OF A-PERIODIC LARGE SCALE FLOW STRUCTURES IN PARTICLE RESUSPENSION IN STIRRED TANKS**

V. Lavezzo, M. Campolo and A. Soldati

**DEVELOPMENTS ON FLOW RATE AND HIGH PRESSURE STABILITY OF PEROXIDE DOSING PUMPS FOR THE CHEMICAL INDUSTRY**

F. Trieb, R. Karl and R. Moderer

### **Safety Scenarios and Assesments**

**LOW TEMPERATURE HYDROCARBON OXIDATION AND EXPLOSION SAFETY**

H.J. Pasman

**THE INHERENT SAFETY OF SUBSTANCES IN INCIDENTAL SCENARIOS: A PROCEDURE FOR THE ASSESSMENT OF HAZARDS DUE TO DECOMPOSITION PRODUCTS**

M. Cordella, A. Tugnoli, P. Morra, F. Barontini and V. Cozzani

**RDF FLUIDISED BED COMBUSTOR SAFETY ISSUES**

369

A. Tinaburri and R. Baciocchi

**SIAR WEB-GIS IN REGIONE PIEMONTE: A PUBLIC ADMINISTRATION TOOL ABOUT SEVESO INSTALLATIONS**

M. Orso Giaccone, E. Ponte, G.M. Giannino, A. Navarretta, B. Basso and M. Zappia

**ASSESSMENT OF THE VULNERABILITY OF INDUSTRIAL SITES TO ACTS OF INTERFERENCE**

M. Sabatini, S. Zanelli and V. Cozzani

**PREDICTIVE EVALUATION OF SURFACE SPREADING EXTENT FOR THE CASE OF ACCIDENTAL SPILLAGE OF OIL ON THE GROUND**

S. Grimaz, S. Allen, J. Stewart and G. Dolcetti

**INTENTIONAL OR ACCIDENTAL SPILLS OF HAZARDOUS MATERIALS IN HARBOURS AREAS: EVALUATION OF CRITICAL DISTANCES FROM SENSIBLE TARGETS**

E. Palazzi and B. Fabiano

**EFFECTIVE INTERFACIAL TENSION AND GEOMETRICAL PARAMETERS RELATIONSHIP FOR THE DESCRIPTION OF OIL LEAKAGES FROM SUBMARINE PIPELINES**

R.M. Baptista, M.B. Quadri, R.A.F. Machado, A. Bolzan, A.L. Nogueira, T.J. Lopes and G.C. Mariano

**EFFECTIVENESS OF REACTING SPRAY CURTAINS MITIGATING TOXIC RELEASES OF HIGH SOLUBILITY GASES** 407

E. Palazzi, F. Curro, R. Pastorino and B. Fabiano

**A SPATIAL DECISION SUPPORT SYSTEM PROTOTYPE FOR ASSESSING ROAD HAZMAT ACCIDENT IMPACTS ON THE POPULATION IN A DENSE URBAN AREA: A CASE STUDY OF THE CITY OF NICE, FRENCH RIVIERA** 413

E. Garbolino, R. Sacile, S. Olampi, C. Bersani, A. Tomasoni, N. Alexandre, E. Trasforini, M. Benza and D. Giglio

**Hydrogen Status & Technologies**

**ON-DEMAND HYDROGEN PRODUCTION FROM BOROHYDRIDE ALKALINE SOLUTION** 419

R. Oronzio, G. Monteleone, A. Pozio, M. De Francesco and S. Galli

**TWO STAGE OPERATION FOR HYDROGEN PRODUCTION FROM METHANE IN FLUIDIZED BED REACTORS** 425

P. Ammendola, R. Chirone, G. Ruoppolo and G. Russo

**MODELLING OF GAS-PHASE MASS-TRANSFER RESISTANCE AT PEMFC ELECTRODES** 431

M. Pinna, E. Arato and P. Costa

**ENERGY SUSTAINABLE DEVELOPMENT THROUGH METHANE AUTOTHERMAL REFORMING FOR HYDROGEN PRODUCTION** 437

P. Ciambelli, V. Palma, E. Palo, G. Iaquaniello, A. Mangiapane and P. Cavallero

**STUDY OF A BASIC MCFC UNIT FOR MODULAR MULTI MW SYSTEMS** 443

D. Marra and B. Bosio

**EFFECT OF MEMBRANE SELECTIVITIES ON WGS REACTION IN A NON-ISOTHERMAL MEMBRANE REACTOR** 449

A. Brunetti, A. Caravella, G. Barbieri and E. Drioli

**MEMBRANE REFORMERS HEATED BY MOLTEN SALTS: A SIMULATION STUDY** 455

M. De Falco, L. Marrelli and L. Di Paola

**S-I THERMOCHEMICAL CYCLE FOR H<sub>2</sub> PRODUCTION: A THERMODYNAMIC ANALYSIS OF THE PHASE EQUILIBRIA OF THE SYSTEM HI-I<sub>2</sub>-H<sub>2</sub>O** 461

M.C. Annesini, F. Gironi, M. Lanchi, L. Marrelli and M. Maschietti

**DEVELOPMENT OF SMALL-SIZE SYN-GAS GENERATION UNITS BY PARTIAL OXIDATION OF NATURAL GAS** 467

V. Terentyev, O. Brizitski, A. Khristolubov and V. Kirillov

## **Waste Reuse**

<b>A NOVEL APPROACH FOR REMOVING AMMONIA AND TAR IN GASIFICATION PROCESSES</b>	473
G. Iaquaniello, E. Pellicano <sup>1</sup> and A. Pipino	
<b>DEPOLIMERIZATION OF PET BOTTLE WASTES TO PRODUCE HIGH- VALUE BHET MONOMER USING ETHYLENGLYCOL</b>	479
A. Moral, R. Irusta, J.M. Martin and L. Martinez	
<b>STUDY OF THE PP PYROLYSIS KINETICS</b>	485
P. Costa, F. Pinto, A.M. Ramos, I. Gulyurtlu, I. Cabrita and M. Bernardo	
<b>DEVOLATILIZATION AND GASIFICATION OF PLASTIC WASTES IN A FLUIDIZED BED REACTOR</b>	491
M.L. Mastellone, U. Arena, G. Barbato, L. Zaccariello, E. Romeo, S. Granata, A. Frassoldati, T. Faravelli and E. Ranzi	
<b>MIXTURES OF TYRES AND PLASTICS WASTES KINETICS</b>	497
M. Miranda, F. Pinto, I. Gulyurtlu, I. Cabrita and A. Matos	

## **VOLUME II**

### **Bio & Food Applications**

<b>THE KETOPROFEN PARTITION BETWEEN SUPERCRITICAL CO<sub>2</sub> AND POLY- VINYL-PYRROLIDONE FOR DRUG DELIVERY SYSTEM PREPARATION</b>	503
M. Banchero, L. Manna, A. Ferri and S. Sicardi	
<b>EXPERIMENTAL CHARACTERISATION OF THE ALGINATE GELATION PROCESS FOR RAPID PROTOTYPING</b>	509
R. Rezende, P. Bartolo, A. Mendes and R. Maciel Filho	
<b>USE OF CELL-WALL DEGRADING ENZYMES TO IMPROVE LYCOPENE EXTRACTION FROM TOMATO PROCESSING WASTE</b>	515
R. Lavecchia and A. Zuorro	

### **Computer Aided Fluid Dynamics**

<b>CFD SIMULATION OF A PARALLEL-COMPETITIVE REACTION SCHEME IN AN UNBAFFLED VESSEL</b>	521
F. Grisafi, F. Scargiali and A. Brucato	
<b>ANALYSIS OF MULTIPHASE REACTING TURBULENT JETS: CASE STUDY ON CARBON INJECTION IN SIDERURGIC FURNACES</b>	527
M. Campolo, M. Andreoli, L. Tognotti and A. Soldati	
<b>GAS DISPERSION SIMULATIONS BY MEANS OF THE KFX CODE</b>	533
G. Ferrara, S. Ditali, R. Fiore and M. D'Amico	

## **Adsorption**

**EARLY-TIME ANALYSIS OF MEMBRANE TRANSPORT** 539

J. Meldon

**EMULSION PERTRACTION TECHNOLOGY IN HOLLOW FIBER MODULES: 545  
APPLICATION TO METALLIC VALORISATION FROM WASTEWATER**

M.F. San Roman, E. Bringas, J.A. Carrera and I. Ortiz

**ARTIFICIAL LIVER OPTIMIZATION: ANALYSIS OF ALBUMIN BOUND 551  
TOXIN ADSORPTION**

M.C. Annesini, V. Piemonte, L. Turchetti and G. Ambrosino

## **Process Industry**

**SIMULATION OF MOLECULAR DISTILLATION PROCESS. 1.** 557

**FORMULATION OF GENERALIZED CORRELATION FOR PREDICTING  
HEAVY LIQUID PETROLEUM FRACTIONS PROPERTIES OF BRAZILIAN  
OIL PETROLEUM.**

L. Zuniga Linan, N.M.N. Lima, J.A. Ballesteros Hernández, L. Plazas Tovar,  
R.S. Rocha, C.B. Batistella, M.R. Wolf Maciel, R. Maciel Filho and L.C. Medina

**NEURAL MODELING OF DISTILLATES YIELD IN VISBREAKING PROCESS** 563

O. Foddi, M. Grossi, S. Tronci, A. Sesselego, U. Spanu and R. Baratti

**MODELING NITROGEN EFFECT ON THE HYDRODESULFURIZATION 569  
PROCESS**

M. Medde, M.L. Diana, R. Baratti and S. Melis

**COMPOSITIONAL RESERVOIR MODELLING BY AN EQUATION 575  
ORIENTED CHEMICAL PROCESS SIMULATOR - I. ANALYSIS AND  
DEVELOPMENT**

G. Pagani, G. Bianchi, L. Carnelli, A. D'Arminio Monforte and E. Roccaro

**A STUDY ON THE DURABILITY OF SELECTED CONSTRUCTION METALS 583  
IN ACIDIC CONDITIONS**

S. Pitkaaho, S. Fauquet, S. Ojala, K. Ainassaari, M. Heikkinen, U. Lassi and R. Keiski

**REVAMP OF ACRYLIC ACID PURIFICATION UNIT - OPTIMIZATION OF 589  
ACETIC ACID SEPARATION**

Q. Smejkal, J. Martinec, M. Svatek and J. Najemník

**EVALUATION OF ADSORBENT MATERIALS FOR THE SAMPLING OF 593  
CHLORINE CONTAINING VOLATILE ORGANIC COMPOUNDS**

M. Heikkinen, K. Pieniniemi, U. Lassi, S. Pitkaaho, S. Ojala and R. Keiski

**STUDY ON THE EFFECT OF SULPHUR AND NITROGEN CONTENT OF GAS 599  
OIL ON THE HYDRODEAROMATIZATION ACTIVITY OF PT-PD/USY  
CATALYSTS**

G. Nagy, J. Hancsok, G. Polczmann, Z. Varga and D. Kallo

**KINETIC STUDY OF THE POLYCONDENSATION OF ACETONE TO PRODUCE 605  
ISOPHORONE ADOPTING ALUMINA AND MAGNESIA AS CATALYST**

A. Sliepcevich, D. Moscatelli and S. Gelosa

**CATALYTIC WET OXIDATION OF PHENOL BY  $(La_{0.8}Sr_{0.2})Mn_{0.98}O_3$  611  
CATALYST IN BATCH REACTOR**

C. Resini, S. Vogler, F. Catania, S. Berardinelli, A. Fedi, O. Paladino and G. Busca

**Phase Equilibria Experiments and Predictions**

**SOLID-LIQUID EQUILIBRIUM FOR THE SYSTEM ACTIVATED CARBON 617  
AND AQUEOUS SOLUTION OF BOTH PHENOL AND DINITRO-O-CRESOL**

G. Sambenedetto, L. Spera, L. Taglieri and G. Di Giacomo

**EXPERIMENTAL DETERMINATION OF VAPOUR-LIQUID EQUILIBRIUM 623  
DATA FOR THE BINARY MIXTURES ISOBUTYL ALCOHOL/DIBUTYL  
ETHER, ISOBUTYL ACETATE/DIBUTYL ETHER AND ISOBUTYL  
ALCOHOL/ISOBUTYL ACETATE AT 101.3 KPA**

C. Gressier, A. Calvet, J. Bonet and M.I. Galan

**LIQUID-LIQUID PHASE EQUILIBRIUM IN GLYCEROL-METHANOL-FATTY 629  
ACIDS SYSTEMS**

L. Marrone, L. Pasco, D. Moscatelli and S. Gelosa

**MODELLING THE BATCH ADSORPTION OF RED CABBAGE 635  
ANTHOCYANINS ON CLAY-POLYMER COMPOSITES**

T.J. Lopes, O.H. Goncalves, M.G.N. Quadri, R.A.F. Machado and M.B. Quadri

**A TRUE BOILING POINT CURVE THROUGH MOLECULAR DISTILLATION 641  
USING FRAMOL CORRELATION**

A. Winter, C.B. Batistella, M.R. Wolf Maciel, R. Maciel Filho, M. Savioli Lopes and  
L.C. Medina

**Bio Fuels & Bio Treatments**

**ENERGY AND ECONOMIC ASSESSMENT OF BIOETHANOL PRODUCTION 647  
BY A DRY MILLING PROCESS**

G. Franceschin, M. Sudiro, A. Zamboni, F. Bezzo and A. Bertucco

**CONTINUOUS BIO-ETHANOL FERMENTATION FROM FOOD INDUSTRY 653  
WASTE UNDER NO STERILE CONDITIONS**

M. Zanette, D. Bolzonella, F. Fatone and F. Cecchi

**ENZYMATIC SYNTHESIS OF BIODIESEL 659**

D. Pirozzi, M. Di Lorenzo, L. Zuccaro and G. Greco

**CLEAN PROCESSES - BIODEGRADATION KINETICS AND 665  
MATHEMATICAL MODELLING OF MICROBIAL REMOVAL OF VINYL  
ACETATE FROM DILUTE GASEOUS WASTE STREAMS**

D. Kasperczyk, G. Bartelmus and A. Gaszczak

**FUNGAL BIOMASS-BASED PROCESSING OF PHENOLICS-RICH 671  
WASTEWATERS**

A. D'Urso, M. Galimberti and M. Bravi

**Waste Treatmnets**

**DANGEROUS SUBSTANCES FROM INDUSTRIAL ACTIVITIES. EMISSIONS 677  
ESTIMATION METHOD FOR SURFACE WATER CONCENTRATION**

P. Gronchi, M. Pinali, P. Centola and R. Del Rosso

**VOLUME OPTIMIZATION OF AEROBIC DIGESTER FOR THE 683  
BIODEGRADATION OF PLANT TANNINS IN INDUSTRIAL WASTEWATER**

M. Tramsek and A. Gorsek

**CD(II) REMOVAL FROM AQUEOUS SOLUTIONS BY ADSORPTION ONTO 689  
ACTIVATED CARBON**

F. Di Natale, A. Erto and A. Lancia

**ENERGY AND WATER IN THE PULP AND PAPER INDUSTRY - THE TWO 695  
SOLITUDES**

E. Mateos Espejel, L. Madtha, M. Marinova and J. Paris

**STEAM REACTIVATION OF THE SO<sub>2</sub> CAPTURE ABILITY OF FLUIDIZED 701  
BED COMBUSTION WASTES**

M. Nobili, A. Telesca, G.L. Valenti, F. Montagnaro, L. Santoro and P. Salatino

**EFFLUENT TREATMENT USING EVAPORATION & CRYSTALLISATION 707  
TECHNOLOGY**

C. Brecknell, M. Lillrott and A. Pavlik

**Drying & Products Properties**

**ENCAPSULATION OF ANTIOXIDANTS BY SPRAY-DRYING 713**

I. Ferreira, S. Rocha and M. Coelho

**FUNCTIONALIZATION OF CASTING MOULD BY MICROWAVE DRYING 719**

Y. Masuda, H. Imakoma, N. Ohmura and E. Ymaguchi

**DRYING OF FINE SAND IN A PILOT PLANT UNIT PROVIDED WITH A 725  
DRAFT-TUBE CONICAL SPOUTED BED**

H. Altzibar, G. Lopez, M.J. San Jose, S. Alvarez and M. Olazar

**THE USE OF AERATION FOR ARCH AND PIPE COLLAPSE IN THE 731  
DISCHARGE OF COHESIVE POWDERS FROM A SILO**

A. Cannavacciuolo, D. Barletta, G. Donsi, G. Ferrari, J. Schwedes and M. Poletto

**ADHESION AND FLAMMABILITY PROPERTIES OF NANOCLLAYS RUBBER 737  
BASED PSA ADHESIVES**

J.R. Bartoli and A.N. Fowler

## **POSTERS**

<b>OPTIMIZATION OF THE EQUIPMENT POSITIONING IN MANUFACTURE OF TISSUE PAPER</b>	743
D.M.D. Drummond and R. Guirardello	
<b>OPTIMIZATION OF FELT LIFE TIME IN PAPER MANUFACTURE</b>	749
D.M.D. Drummond, M.T.M. Rodrigues and R. Guirardello	
<b>PRODUCTION OF FULLY DENSE Zrb<sub>2</sub>-Sic Uhtc MATERIALS</b>	755
R. Orru, R. Licheri, A. Locci, C. Musa and G. Cao	
<b>DEVELOPMENT OF A PROCESS SUSTAINABLE PREDICTION (PSP) FRAMEWORK</b>	761
M. Fermeglia, G. Longo and L. Toma	
<b>EFFECT OF TEMPERATURE ON THE ELECTROMECHANICAL PROPERTIES OF ELASTOMERS</b>	767
R. Kunanuruksapong and A. Sirivat	
<b>THE ELECTRO-RESPONSIVE DRUG DELIVERY FROM SALICYLIC ACID - LOADED POLYACRYLAMIDE HYDROGELS</b>	773
S. Niamlang and A. Sirivat	
<b>CREEP AND RECOVERY BEHAVIORS OF POLYANILINE/SILICONE OIL SUSPENSIONS UNDER ELECTRIC FIELD</b>	779
P. Hiamtup and A. Sirivat	
<b>ATMOSPHERIC DISPERSION OF JETS CONNECTED WITH FLAMMABLE AND/OR TOXIC GASEOUS RELEASES</b>	785
E. Palazzi and B. Fabiano	
<b>BIOSORPTION AND BIOPRECIPITATION OF HEAVY METALS IN BIOLOGICAL PERMEABLE REACTIVE BARRIERS</b>	791
F. Pagnanelli, S. Mainelli, F. Veglio, B. Bianco, F. Beolchini and L. Toro	
<b>IMMOBILIZATION OF HEAVY METALS IN CONTAMINATED SOILS</b>	797
S. Montinaro, A. Concas, M. Pisu, S. Fadda, A. Cincotti and G. Cao	
<b>MODELING OF STEM CELLS DIFFERENTIATION</b>	803
M. Pisu, A. Concas and G. Cao	
<b>PHYSICO-CHEMICAL TREATMENT OF WOOL SCOURING EFFLUENT</b>	809
J. Labanda and J. Llorens	
<b>LONG-TERM OPERATION OF A FULL SCALE INTERMITTENT MBR</b>	815
F. Fatone, P. Battistoni, P. Pavan and F. Cecchi	
<b>DECENTRALIZED INTEGRATED TREATMENT OF KITCHEN WASTE AND MUNICIPAL WASTEWATER BY FOOD WASTE DISPOSERS AND ALTERNATE CYCLES</b>	821
P. Battistoni, A.L. Eusebi, D. Bolzonella and G. Carletti	

<b>A SYSTEMATIC PROCEDURE TO SET UP THE GENETIC ALGORITHM PARAMETERS FOR LARGE SCALE SYSTEMS: APPLICATION TO A THREE-PHASE CATALYTIC REACTOR</b>	827
M. Rezende, A.C. Costa, R. Maciel Filho, P. Bartolo and R. Rezende	
<b>DISPERSION OF ATMOSPHERIC PARTICULATE EMISSIONS IN BUILT-UP AREAS CLOSE TO A STEEL MILL</b>	833
E. Baiutti, A. Borroni, M. Derudi, F. Moimas, E. Salvagni, D. Mazzilis and E. Piccoli	
<b>A METHODOLOGY TO UPGRADE MUNICIPAL WWTPS BY ALTERNATING SYSTEM</b>	839
E. Cola, P. Battistoni, F. Fatone and P. Pavan	
<b>OXYGEN SENSING PROPERTIES OF Fe DOPED-Sr<sub>2</sub>TiO<sub>3</sub> POWDERS OBTAINED BY SELF-PROPAGATING HIGH-TEMPERATURE SYNTHESIS (SHS) AND TREATED BY BALL MILLING (BM)</b>	845
R. Licheri, R. Orru, G. Cao, G. Neri, A. Bonavita, G. Micali and G. Rizzo	
<b>KINETIC OF GAS-LIQUID HOMOGENEOUS CATALYTIC OXIDATION OF CYCLOHEXANE</b>	851
S. Gelosa, D. Moscatelli, D. Gelosa and M. Masi	
<b>CFD MODELLING OF AN AEROSOL EXPOSURE CHAMBER FOR MEDICAL STUDIES</b>	857
G. Manenti, M. Derudi, G. Nano and R. Rota	
<b>KINETIC STUDY OF THE EFFECT OF CATALYST IN THE POLYCONDENSATION OF LACTIC ACID TO PRODUCE LOW MOLECULAR WEIGHT POLYMERS</b>	863
D. Moscatelli, S. Gelosa, H. Yogesh and G. Storti	
<b>BIOENERGY FROM WASTE ACTIVATED SLUDGE AND MARKET-WASTE: SINGLE AND TWO PHASE THERMOPHILIC CODIGESTION</b>	869
C. Cavinato, P. Pavan, F. Fatone and F. Cecchi	
<b>OCCURRENCE AND REMOVAL OF HEAVY METALS FROM INDUSTRIAL AND MUNICIPAL WASTEWATER: A COMPARISON BETWEEN MBR AND CONVENTIONAL ACTIVATED SLUDGE PROCESSES (CAS)</b>	875
G. Carletti, P. Pavan, D. Bolzonella and C. Cavinato	
<b>MODELLING TRIETHYLENE GLYCOL-WATER SYSTEM FOR NATURAL GAS DEHYDRATION</b>	881
F. Gironi, M. Maschietti and V. Piemonte	
<b>REACTIVITY OF SEVERAL OLEFINS IN THE HDS OF FULL BOILING RANGE FCC GASOLINE OVER CoMo/Al<sub>2</sub>O<sub>3</sub></b>	887
S. Magyar, J. Hancsok and D. Kallo	
<b>APPLICATION OF SUNFLOWER OILS WITH HIGH OLEIC ACID CONTENT AND THEIR DERIVATES AS FUELS FOR DIESEL ENGINES</b>	893
A. Beck, J. Hancsok and M. Krar	

<b>CHARACTERIZATION AND STUDY OF CATALYTIC ACTIVITY OF Cu/ZnO/Al<sub>2</sub>O<sub>3</sub> SYSTEMS FOR OXIDATIVE STEAM REFORMING OF METHANOL</b>	899
M. Turco, G. Bagnasco, C. Cammarano, U. Costantino and M. Sisani	
<b>SEPARATION OF ASPHALTENS AND LUBE OIL FROM PETROLEUM RESIDUM BY SUPERCRITICAL DEASPHALTING</b>	905
V.O.C. Cardenas, E.T. Koroishi, F.A.B. Quirino, F.W.R. Rivarola, E. A. Boss, G.W.C. Oliveira, M.R. Wolf Maciel, R. Maciel Filho and L.C. Medina	
<b>A MATHEMATICAL MODEL OF THE CATALYTIC HEAT-COUPLED REACTOR OF STEAM METHANOL REFORMING</b>	911
V. Kirillov, A. Shigarov, N. Kuzin and V. Kireenkov	
<b>DEVELOPMENT OF A MEMBRANE - BASED FUEL PROCESSOR FOR FUEL CELL (FC) POWER PLANTS</b>	917
I. Ivanov, O. Brizitski, V. Terentyev and V.V. Barelko	
<b>DEVELOPMENT OF HIGH-PERFORMANCE OXYGEN-CONDUCTING MEMBRANES AND COMPACT SYNTHESIS GAS GENERATORS ON THEIR BASE</b>	923
A. Khristolubov, O. Brizitski, V. Terentyev, A.K. Avetisov, E.D. Politova, V.A. Sadykov, N.V. Mezentseva, V.S. Muzykantov, O.I. Snegurenko, A.I. Lukashevich, G.M. Alikina, C.H. Batuev, V.V. Zyryanov and N.F. Uvarov	
<b>REFORMING OF DIMETHYL ETHER TO HYDROGEN-RICH GAS FOR HT PEM FUEL CELLS</b>	929
V. Sobyanin, V. Kirillov, S. Badmaev, V. Belyaev and V. Mescheriakov	
<b>MEMBRANE DISTILLATION OF H<sub>2</sub>O-HI MIXTURES FOR THE S-I THERMOCHEMICAL WATER SPLITTING PROCESS</b>	935
G. Caputo, A. Giaconia, C. Felici, M. Lanchi and S. Sau	
<b>NA-TECH ACCIDENTS INDUCED BY FLOODS: AN APPROACH TO HAZARD AND RISK ASSESSMENT</b>	941
M. Campedel, G. Spadoni and V. Cozzani	
<b>INVESTIGATION OF FREE RADICAL POLYMERIZATION OF USING BIFUNCTIONAL INITIATORS</b>	947
P. Machado, C. Franco and L. Lona	
<b>MODELLING AND SIMULATION OF HIGH PRESSURE INDUSTRIAL AUTOCLAVE POLYETHYLENE REACTOR</b>	953
E. Caliani, M. Cavalcanti, F. Fernandes and L. Lona	
<b>PROJECT DESIGN AND PROCESS CONTROL IMPROVEMENTS BY DYNAMIC SIMULATION OF TRANSIENTS</b>	959
S. Signor, F. Manenti, M. Rovaglio and A. Merati	
<b>SUBHARMONIC OSCILLATIONS , RELAY ON-LINE TUNING AND PROCESS IDENTIFICATION</b>	965
A. Balestrino, A. Landi and L. Sani	

**IMPROVED PHOTOCATALYTIC SYNTHESIS OF BENZENE BY OXIDATIVE 971  
DEHYDROGENATION OF CYCLOHEXANE ON MoO<sub>x</sub>/TiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>  
CATALYSTS**

P. Ciambelli, D. Sannino, V. Palma and V. Vaiano

**AN INVESTIGATION ON THE STABILITY AND THE DYNAMIC FEATURES 977  
OF A TURBIDOSTAT**

A. Cammarota, M. Miccio and M. Poletto

**THE EFFECT OF TURBULENCE ON THE THEORETICAL EVALUATION OF 983  
DUST EXPLOSIONS SEVERITY**

P. Russo and A. Di Benedetto

**OPTIMIZING BROMELAIN EXTRATION BY REVERSED MICELLES FROM 989  
PINEAPPLE FRUIT**

A.M. Frattini Fileti, G.A. Fischer and E.B. Tambourgi

**ANALYSIS OF THE DIFFERENCES IN KLA VALUES DETERMINED BY 995  
DIFFERENT VARIANTS OF THE DYNAMIC METHOD IN STIRRED TANKS**

F. Scargiali, F. Grisafi and A. Brucato