



ECS

11

EUROPEAN COATING SYMPOSIUM ÅBO/TURKU

SYMPOSIUM PROGRAM

Wednesday - June 8, 2011

08:00 **Registration**

09:00 **Welcome: M. Toivakka (ECS 2011 chair)**

1 Opening session

Session chair: Prof. Martti Toivakka

09:05 **Predicting the dynamics of dewetting**

T. D. Blake and J. De Coninck

University of Mons, BE

09:30 **Comparison of large scale coating techniques for polymer particle films in hybrid solar cells**

L. Wengeler, M. Schmitt, P. Darmstädter, C. Kroner, K. Peters, K. Köhler, P. Niyamakom, P. Scharfer and W. Schabel

Karlsruhe Institute of Technology, DE

09:55 **Experimental study of the effect of surface-absorbed hydrophobic particles on the Landau-Levich law**

M. Oureimi and G. M. Homsy

University of British Columbia, CA

10:20 **A mathematical model for the lubrication of the human knee**

D. J. Knox, S. K. Wilson, B. R. Duffy and S. McKee

University of Strathclyde, UK

10:45 Coffee break / Exhibition

2.1 Printed electronics 1

Session chair: Prof. Wilhem Schabel

11:10 **Coating technologies and coating plant concepts for thin film liquid coating layers for conductive films**

A. Glawe and C. Dittrich

Coatema Coating Machinery GmbH, DE

11:30 **Production technologies for large area flexible electronics and OPV**

T. Kolbusch and A. Glawe

Coatema Coating Machinery GmbH, DE

11:50 **Progress in patterning technologies for R2R slot die coating for OLED and OPV application**

J. Gabel, I. de Vries, R. Mandampambil, A. Langen and R. Andriessen

Holst Centre/TNO, NL

12:10 **Surface energy control method for printed paper electronics**

K. Dogome, T. Enomae and A. Isogai

University of Tokyo, JP

2.2 Wetting 1

Session chair: Prof. Hadj Benkreira

Dynamics of wetting and Kramers' theory

T. Blake and J. De Coninck

Université de Mons, BE

Evolution of the diffusive precursor film of a wetting fluid at the vicinity of the moving contact line

A. Hoang and P. Kavehpour

University of California, US

Mathematical modeling and numerical simulation of wave-front flow on a vertical wall with surfactant effects

L. W. Schwartz and M. R. Davidson

University of Delaware, US

Coating and redistribution of thin liquid films on chemically patterned substrates

B. J. Brasjen and A. A. Darhuber

Eindhoven University of Technology, NL

12:30 Lunch break / Exhibition

3.1 Printed electronics 2

Session chair: Dr. Ike de Vries

14:00 **Liquid film coating of small molecule OLEDs (SMOLEDs) with multilayer device structure**

K. Peters, U. Berner, S. Hartmann, D. Bertram, P. Scharfer and W. Schabel

Karlsruhe Institute of Technology, DE

3.2 Wetting 2

Session chair: Dr. Terry D. Blake

Delaying wetting failure in coating flows via meniscus confinement

E. Vandre, M. S. Carvalho and S. Kumar

University of Minnesota, US

14:20 **Tuning polymer-fullerene blend nanomorphology by controlled film drying conditions**

B. Schmidt-Hansberg, M. Sanyal, M. Klein, F. Buss, A. Colsmann, U. Lemmer, E. Barrena, P. Scharfer and W. Schabel
Karlsruhe Institute of Technology, DE

14:40 **Printed low-voltage organic transistors on plastics and paper**

D. Tobjörk, R. Bollström, P. Dolietis, A. Määttänen, P. Ihalainen, T. Mäkelä, J. Peltonen, M. Toivakka and R. Österbacka
Abo Akademi University, FI

15:00 **Printability of functional inks on multilayer curtain coated paper**

R. Bollström, D. Tobjörk, P. Dolietis, A. Määttänen, P. Ihalainen, P. Salminen, J. Peltonen, R. Österbacka and M. Toivakka
Abo Akademi University, FI

Unsteady similarity solutions for a moving dry patch in a flowing liquid film

B. R. Duffy, Y. M. Yatim and S. K. Wilson

University of Strathclyde, UK

Dynamics of a complete wetting liquid under evaporation

C.-T. Pham, G. Berteloot, F. Lequeux and L. Limat

University Paris-Sud, FR

Can we predict the spreading of a two liquid system from the spreading of corresponding liquid-air systems?

S. Goossens, D. Seveno, R. Rioboo, A. Vaillant, J. Conti and J. De Coninck

University of Mons, BE

15:20 **Coffee break / Exhibition**

4.1 Coating processes 1

Session chair: Dr. Peter Schweizer

15:50 **Flux distribution in deformable roll coating flow**

S. Sarma, H. Benkreira and M. Cosgrove
University of Bradford, UK

16:10 **High speed very thin films with reverse roll coating**

Y. Shibata, H. Benkreira and K. Ito
University of Bradford, UK

16:30 **Advanced rheometrical characterisation of modern industrial paints for the generation of model coating formulations**

S. Sarma, H. Benkreira, R. J. English and M. Cosgrove

University of Bradford, UK

16:50 **Analytical solution of steady state multiple roll system with experimental validation**

B. Willinger, Ph. Epple and A. Delgado
Friedrich-Alexander University of Erlangen-Nürnberg, DE

4.2 Wetting 3

Session chair: Prof. Joël De Coninck

Pseudo partial wetting in liquid-liquid systems

L. Du, H. Bodiguel and A. Colin
University of Bordeaux, FR

Contact line dynamics in immersion lithography

M. Riepen
ASML Research, NL

Liquid transfer in printing processes

S. Dodds, M. Carvalho and S. Kumar

University of Minnesota, US

Partial wetting meandering

S. Couvreur and A. Daerr
University Paris Diderot, FR

17:30 **5 Poster Session and Welcome Reception**

19:30 **Scientific Committee Meeting**

6.1 Coating processes 2

Session chair: Dr. Shuzo Fuchigami

09:00 Slot coating with rarefied low viscosity gases

H. Benkreira and J. B. Ikin

University of Bradford, UK

09:20 Development of new products with optimized dies

H. Döll

TSE Troller AG, CH

09:40 CFD simulation and experimental study of the flow in the cavities of a slide die curtain coater

P. Martinez, M. Rueff, D. Guérin and V. Morin

Centre Technique du Papier, FR

6.2 Thin films

Session chair: Dr. Jarkko J. Saarinen

Nonlinear dynamics of a nonisothermal thin liquid coating of a horizontal cylinder subjected to thermocapillarity and axial vibration

O. Haimovich and A. Oron

Technion - Israel Institute of Technology, IL

Formation of topographical patterns on liquid film multilayer coatings using electric fields

S. A. Roberts and S. Kumar

University of Minnesota, US

Gravity driven thin film flow over patterned substrate: the influence of thermal effects on rivulet formation

D. Slade, P. H. Gaskell and Y.C. Lee

University of Leeds, UK

10:00 Coffee break / Exhibition

7.1 Coating processes 3

Session chair: Prof. Satish Kumar

10:25 A predictive model for discrete cell gravure roll coating

N. Raske, R. Hewson, N. Kapur and P. H. Gaskell

University of Leeds, UK

10:45 High speed coating of a fiber: influence of the fluid properties on coating thickness

D. Vermaut, Y. Lepetitcorps and E. Arquis

University of Bordeaux, FR

11:05 Numerical modeling of gas-jet wiping process

K. Myrillas, P. Rambaud, J.-M. Mataire, P. Gardin, S. Vincent and J.-M. Buchlin

von Karman Institute for Fluid Dynamics, BE

11:25

7.2 Drying 1

Session chair: Prof. Wilhelm Schabel

Evaporation of thin liquid films on chemically patterned surfaces

J. A. Vieyra Salas and A. A. Darhuber

Eindhoven University of Technology, NL

Investigation of surface deformation due to Marangoni convection

P. Cavadini, J. Krenn, D. Garella, P. Scharfer,

W. Schabel, D. Sachsenheimer,

A. Kowalczyk and N. Willenbacher

Karlsruhe Institute of Technology, DE

Visualization of lateral material flow during inhomogeneous drying of thin polymeric films

D. Sachsenheimer, P. Cavadini, A. Kowalczyk,

P. Scharfer, W. Schabel and N. Willenbacher

Karlsruhe Institute of Technology, DE

Investigation of multi-solvent mass transport during thin film drying by means of inverse-micro-Raman-spectroscopy (IMRS)

P. Scharfer and W. Schabel

Karlsruhe Institute of Technology, DE

11:45 ECS announcements

12:00 Lunch break / Exhibition

8.1 Colloidal suspensions

Session chair: Prof. Laurent Limat

13:30 Dip coating with colloids and evaporation

G. Berteloot, A. Daerr, F. Lequeux and L. Limat

University Paris Diderot, FR

8.2 Drying 2

Session chair: Dr. Philip Scharfer

The effects of end groups of polymers on drying rates of phase separating coatings

M. Yamamura, T. Yamakawa, Y. Mawatari and H. Kage

Kyushu Institute of Technology, JP

13:50 Fabrication of robust particle coated model surfaces using Langmuir-Blodgett deposition

P. M. Hansson, L. Skedung, E. Thormann, A. Swerin, P. M. Claesson, M. W. Rutland, J. Schoelkopf and P. A. C. Gane
YKI Institute for Surface Chemistry, SE

14:10 Self-assembly of drying colloidal suspensions at low capillary number

C. Hsueh, C. L. Moraila-Martínez, F. Doumenc, M. A. Rodríguez-Valverde and B. Guerrier
University Paris-Sud, FR

14:30 Assisted drop evaporation: A new route for the formation of nanoparticle deposits

C. L. Moraila-Martínez, M. Cabrerizo-Vílchez and M. A. Rodríguez-Valverde
University of Granada, ES

14:50 Effect of relative humidity on the evaporation of a colloidal solution droplet

A. Keshavan, A. Hoang, G. Berteloot, L. Limat and P. Kavehpour
University of California, US

15:10 Imaging the drying of a colloidal suspension: Velocity field

H. Bodiguel and J. Leng
University of Bordeaux, FR

In-situ monitoring of viscosity and surface irregularity in drying coatings using particle tracking experiments

J.-O. Song and L. Francis

University of Minnesota, US

Drying behavior of waterborne polymer mixtures for biosensor films

S. Kachel, Y. Zhou, S. DuVall, P. Scharfer and W. Schabel
Karlsruhe Institute of Technology, DE

Drug-polymer coating microstructure evolution during thin film drying

B. R. Forsyth, J.-O. Song and L. Francis

Boston Scientific Corporation, US

In-situ characterization of structure gradient development in UV cured coatings

J.-O. Song and L. Francis

University of Minnesota, US

Thin film drying in a continuous belt-dryer using CFD

F. Brinckmann, I. Shevchuk and P. Stephan
Technische Universität Darmstadt, DE

ECS Symposium Dinner

Friday - June 10, 2011

9.1 Speciality coatings

Session chair: **Dr. Simona Rucareanu**

08:30 Application of ultrasounds to the electrodeposition of nickel matrix nanocomposite coatings

C. Zanella, S. Rossi and F. Deflorian

University of Trento, IT

08:50 Effect of silver nano-layer using sputtering method on surface properties of cotton fabrics

S. Shahidi, Z. Abdolahi and M. Ghoranneviss

Islamic Azad University, IR

09:10 Functionalization of carbon nanotubes with different hydrophobic organosilane moieties and their influence on wetting properties nanocomposites

M. M. R. Nayini, S. Bastani and Z. Ranjbar

Institute for Colorants, Paint and Coatings, IR

09:30 Hybrid sol-gel coatings as protection for light aeronautical alloys: Impact of pigments and curing time on characteristics and performance

E. Campazzi, M. Villatte, S. de Monredon-Senani and C. Druetz
EADS Innovation Works, FR

9.2 Droplets 1

Session chair: **Prof. George Homsy**

Molecular dynamics simulation of liquid-liquid spreading

D. Seveno, T. D. Blake, S. Goossens, and J. de Coninck

University of Mons, BE

Contact angle hysteresis at the nanometer scale

T. Ondarçuhu, M. Delmas and M. Monthieux

University of Toulouse, FR

Numerical simulation of droplet behavior on substrates for application in ink jet printed patterns: Modeling and experimental verification

O. Schneider, Ph. Epple, E. Teuber, M. P. M. Jank,

C. Rauh and A. Delgado

Friedrich-Alexander University of Erlangen-Nürnberg, DE

Dynamics of spreading of liquid on a hydrogel substrate

T. Kaijiya, A. Daerr, L. Royon, T. Narita, F. Lequeux and

L. Limat

University Paris Diderot, FR

09:50 **Synthesis and effect of zinc ferrite nanoparticles on the mechanical properties of polyester/melamine nanocomposite**

S. Mahvidi, M. Gharagozlou and M. Mahdavian

Institute for Color Science and Technology, IR

Wetting of a soluble thin film of polymer

J. Dupas, E. Verneuil, L. Talini, L. Forny, M. Ramaioli and F. Lequeux

ESPCI ParisTech, FR

10:10 **Coffee break / Exhibition**

10.1 Coating degradation

Session chair: Dr. Parvez Alam

10:40 **Evaluation of abrasion resistance of enamel coatings**

S. Rossi, E. Scrinzi and C. Zanella

University of Trento, IT

11:00 **Cathodic electrodeposition of nano titania along the epoxy based coating and evaluation of its anti corrosion properties**

M. Rashvand and Z. Ranjbar

Institute for color science and technology, IR

11:20 **Microcapsule-containing anticorrosive coatings: Formulation, application and testing**

T. Nesterova, K. Dam-Johansen and S. Kiil

Technical University of Denmark, DK

11:40

10.2 Droplets 2

Session chair: Prof. Hadj Benkreira

Writing at sub-micron scale using a liquid nanodispenser

L. Fabié and T. Ondarçuhu

University of Toulouse, FR

Adjusting wetting properties of paperboard by liquid flame spray process

M. Stepien, J. J. Saarinen, H. Teisala, M. Tuominen, M. Aromaa, J. Kuusipalo, J. M. Mäkela, M. Toivakka

Abo Akademi University, FI

Imbibition of picoliter droplets by homogeneous porous media and inkjet paper – Theory and experiments

A. Oko, A. Swerin and P. M. Claesson

YKI Institute for Surface Chemistry, SE

Modelling the dynamics of effective thermal conductivity during liquid absorption in porous coatings

P. M. Gerstner, G. P. Matthews and P. A. C. Gane

Aalto University, FI

12:00 **Lunch / End of Symposium**

List of Posters

P1 Investigation on process induced morphology changes of lithiumion battery electrodes - initial results

M. Baunach, K. Peters, S. Indris, J. Tübke, P. Scharfer and W. Schabel

Karlsruhe Institute of Technology, DE

P2 Investigation of the gas phase mass transport on flat plates by experiment and numerical simulation

M. Baunach, P. Cavadini, B. Schmidt-Hansberg, J. Krenn, W. Schabel and P. Scharfer

Karlsruhe Institute of Technology, DE

P3 Analysis of waterproofing effect by crystalline technology

S. Bohus and R. Drochytka

Brno University of Technology, CZ

P4 Nano additives – the way to better eco friendly waterborne coatings

D. Burgard, M. Herold and K. Steingröver

Bühler PARTEC GmbH, DE

- P5 Investigation of heat transfer within an array of impinging jets with local extraction of spent fluid**
P. Cavadini, L. Wengeler, P. Scharfer and W. Schabel
Karlsruhe Institute of Technology, DE
- P6 Spontaneous drop spreading of water/glycerol solutions on glass: new evidences about the friction of a liquid moving against a solid surface**
D. Duviolier, D. Seveno, R. Rioboo and J. De Coninck
University of Mons, BE
- P7 The study of diffusion ions and water in powder and liquid epoxy coatings of pipeline with using fluorescence microscopy and afm methodology**
H. R. Esfahany
SAFA Rolling and Pipe Mills Co, IR
- P8 Toughening of epoxy resin blended usable in coating of oil and gas pipe lines with thermo tropic hydroxvethyl cellulose acetate**
H. R. Esfahany
SAFA Rolling and Pipe Mills Co, IR
- P9 The modeling of relation between coating processes parameters and inherent epoxy coating parameters for two size of pipe (56, 64 inch diameter)**
H. R. Esfahany
SAFA Rolling and Pipe Mills Co, IR
- P10 Characterization of UV curable acrylic coatings modified using organically functionalized silica nanoparticles**
M. Fedel, F. Deflorian, S. Dirè, V. Tagliazucca, R. Bongiovanni, L. Vescovo, M. Minelli and M. G. De Angelis
University of Trento, IT
- P11 Cold soluble bio-polymer for sustainable coating**
D. Glittenberg
Cargill Deutschland GmbH, DE
- P12 Characterization of liquid crystalline thermosetting polymer coatings for aerospace applications**
G. Guerriero, S. J. Garcia, R. Alderliesten and R. Benedictus
Delft University of Technology, NL
- P13 Diffusion of water in polymer mixtures for blood glucose test strips**
S. Kachel, Y. Zhou, S. DuVall, P. Scharfer and W. Schabel
Karlsruhe Institute of Technology, DE
- P14 Nano pattern formation on galvanized steel surface by ion sputtering**
T. C. Kim
POSCO Technical Research Laboratories, KR
- P15 Numerical simulation of photonic crystal fibres**
G. Luzzi, P. Epple, M. Scharrer, K. Fujimoto, C. Rauh and A. Delgado
Lehrstuhl für Strömungsmechanik, DE
- P16 Effects of functionalization on properties of carbon nanotube/polyestermelamine nanocomposite coatings**
M. M. R. Nayini, S. Mahvidi, S. Bastani, Z. Ranjbar, M. Gharagozlou and M. Mahdavian
Institute for Colorants, Paint and Coatings, IR

- P17 Up-scaling biohybrid barrier coating to pilot coater**
K. Matilainen, V. Kunnari, J. Vartiainen, J. Hartman, H. Nykänen, J. Pere, T. Tammelin, S. Peltonen, M. Härkönen, M. Vähä-Nissi, T. Mustonen and A. Harlin
VTT Technical Research Centre of Finland, FI
- P18 Test results of electronic gap tool to confirm gap sizes in adjustable extruder dies operating at 260°C**
J.-P. Meheu
CAPACITEC EUROPE, FR
- P19 Dispersant design via RAFT-mediated polymerization and their utilization in paper coating**
R. Nilsson, M. Pahlevan, J. Asplund, C.-E. Wilén, M. Toivakka, P. Alam, F. Touaiti, S. Hietala and H. Tenhu
Abo Akademi University, FI
- P20 Effect of coating parameters on tribological and machining performance of pulsed DC closed field unbalanced magnetron sputtered TiN coating**
A. Shah, P. Mandal and S. Paul
Indian Institute of Technology Kharagpur, IN
- P21 Particle distribution in a drying particulate coating under the influence of soluble polymer binder**
F. Buss, K. Crawford, K. Peters, P. Scharfer, W. Schabel and L. F. Francis
Karlsruhe Institute of Technology, DE
- P22 The benefits of applying a non-stick coating for fry pans by curtain**
D. Verreyken and T. Philippe
DuPont de Nemours, BE
- P23 Determination of mutual diffusion coefficients in polymersolvent systems – a critical review of the scientific landscape**
P. Scharfer, K. Peters and W. Schabel
Karlsruhe Institute of Technology, DE
- P24 Moisture content and its transport in paper**
C.-M. Tåg
Forest Pilot Center, FI
- P25 Localized plasma deposition of organosilicon layers on polymer substrates**
M. Theelen, D. Habets, H. Winands, J. Gabel and P.-J. Bolt
TNO Technical Sciences, NL
- P26 The effect of latex and polymer dispersants on the mechanical and viscoelastic properties of pigment coatings**
F. Touaiti
Abo Akademi University, FI