

4. Publications

4.1 Theses

4.1.1 Doctoral theses (7)

Jayanta Kumar Baral: Electrical characterization of organic memories using polarizable nanoparticles.

Janne Puputti: A sol-gel derived adhesive for industrial use.

Virpi Ääritalo: Silicon releasing sol-gel TiO₂-SiO₂ thin films for implant coatings.

Anders Sand: Microscopic simulation of pigment coating consolidation.

Majju Pykönen: Influence of plasma modification on surface properties and offset printability of coated paper.

Joakim Järnström: Topography and wetting of pigment coated surfaces.

Mikael Järn: Influence of topography and surface chemistry on the wetting properties of TiO₂-based ceramic coatings, *submitted*.

4.1.2 Licentiate thesis (2)

Thomas Sandberg: Beräkningskemiska studier av lignaner.

Saila Jämsä: Changes in properties of pinewood (*Pinus sylvestris*) during heat treatment (180 and 230 C).

4.1.3 Master of science theses (17)

Noémie Lloret: Synthesis, functionalization and characterization of mesoporous silica nanoparticles.

Damien Bazin: Hierarchically porous silica and metal oxide spheres – synthesis and characterization.

Jérémy Salas: Determination of bleaching kinetics order of a photochromic Keggin type polyoxometalate in different organic media by visible and IR spectroscopy.

Jawad Sarfraz: External surfaces of mineral based functional materials sedimentation.

Bartosz Ziółkowski: Non-halogenated fire retardants for two component polyurethane adhesive.

Markus Finne : Polymerisation av vegetabiliska oljor som bränslen för dieselmotorer.

Balakrishna Banaboina: Synthesis of 4,4'-biscyclohexylazocyclohexylmethane and its utilization as flame retardant for polyolefins.

Jonas Lithen: Rheology of plastic bonded explosives.

Xuehan He: Fabrication and characterization of proton conducting membranes.

Anton Holappa: Screening of PEX pipe properties influenced by processing parameters and correlation to long term service properties.

Minna Kaskinen: Experimental studies of paint hardeners used in two-component paints.

Zeeshan Nasir: Correlating polymer thermal properties with heat sealing properties.

Peter Uppstu: Syntes och in vitro nedbrytning av porös poly(L-lactid-sam- α -glycidyl- ϵ -kaprolacton) i blandningar med poly-D,L-lactid.

Hanna Silvaani: Plasma activation of pigment coated papers and its effect on offset printability.

Zhenhua Song: Nanoparticles based on hyaluronan derivatives obtained by RAFT.

Yiming Zhao: Thermoresponsive oligomer brushes grafted to gold nanoparticles.

Niko Granvist: Controlled synthesis of polyelectrolytes using the RAFT method

4.1.4. Bachelor of science theses (7)

Erik Holm: Spinntronic.

Erkka Peltonen: Akvatiska alkoholhaltens volymetriska och dermatologiska effekt.

Dennis Kronlund: Termodynamisk karakterisering av galaktoglukomannans löslighetsegenskaper.

Björn Törngren: Tunnfilmssolceller känsliggjorda med färgämnen.

Linda Ohvo: Syntes av sfäriska kiseldioxidpartiklar med kompakt kärna och mesoporöst skal.

Tina Gulin: Fotokromism i mesoporösa material.

Tommy Back: Utveckling av en ny metod för mätning av barriäregenskaper mot lösningsmedel på papper.

4.2 Articles

4.2.1 Publications in reviewed journals (142)

Publications not listed in Annual Report 2008

H. Koivula, J. Preston, P. Heard, and M. Toivakka: "Visualisation of the distribution of offset ink components printed onto coated paper." *Colloids and Surfaces A: Physicochemical and Engineering Aspects* 2008, 317 (1-3), 557–567.

Anders Sand, Martti Toivakka, and Tuomo Hjelt: "Investigation of filtercake stability using numerical simulation technique." *TAPPI Journal* 2008, 7(2), 4-10.

Anders Sand, Martti Toivakka, and Tuomo Hjelt: "Influence of drying strategy on coating layer structure formation." *Nordic Pulp & Paper Research Journal* 2008, 23 (1) 46-51.

M. Juuti, H. Koivula, M. Toivakka, and K.-E. Peiponen: "A diffractive gloss meter for local gloss measurements of papers and print." *Tappi Journal* 2008, 7 (4)27-32.

Parvez Alam and Martti Toivakka: "Micro-buckling of paper during blade metering." *Computers and Chemical Engineering* 2008, 32, 600-607.

Parvez Alam, Martin Andell, and Dave Smedley: "Mechanical repair of timber beams fractured in flexure using bonded-in reinforcements." *Composites: Part B*, 2008.

Jarkko J. Saarinen, Sharon M. Weiss, Philippe M. Fauchet, and J. E. Sipe: "Reflectance analysis of a multilayer one-dimensional porous silicon structure: Theory and experiment." *J. Appl. Phys.* 2008, 104, 013103.

Jarkko J. Saarinen and J. E. Sipe: "A green function approach to surface optics in anisotropic media." *J. Mod. Opt.* 2008, 55, 13-32.

Markus Nuopponen, Katriina Kalliomäki, Antti Laukkanen, Sami Hietala, Heikki Tenhu: "A-B-A stereoblock copolymers of N-isopropylacrylamide". *Journal of Polymer Science Part A: Polymer Chemistry* 2008, 46, 38-46.

Dilek Kul, Lieven M. Van Renterghem, Michael A.R. Meier, Satu Strandman, Heikki Tenhu, Sevil S. Yilmaz, Ulrich S. Schubert, Filip E. Du Prez: "Encapsulation and release by star-shaped block copolymers as unimolecular nanocontainers." *Journal of Polymer Science Part A: Polymer Chemistry* 2008, 46, 2, 650-660.

2009-2010 publications

C.-M. Tåg, M. Pykönen, J.B. Rosenholm, and K. Backfolk: "Wettability of model fountain solutions: The influence on topo-chemical and -physical properties of offset paper." *Journal of Colloid and Interface Science* 2009, 330 (2), 428-436.

Jessica M. Rosenholm, Annika Meinander, Emilia Peuhu, Rasmus Niemi, John. E. Eriksson, Cecilia Sahlgren, and Mika Lindén: "Targeting of porous hybrid silica nanoparticles to cancer cells." *ACS Nano* 2009, Vol. 3 (1), 197-206.

Jarl B. Rosenholm: "Solubility and interaction parameters as references for solution properties I. Exceptional mixing and excess functions." *Advances in Colloid and Interface Science* 2009, 146, 31-41.

Bjarne Johansson, Rauno Friman, Hannele Hakanpää-Laitinen, Jarl B. Rosenholm: "Solubility and interaction parameters as references for solution properties II. Precipitation and aggregation of asphaltene in organic solvents." *Advances in Colloid and Interface Science* 2009, 147-148, 132-143.

B. Granqvist, G. Hedström, J.B. Rosenholm: "Acid-base interaction of probes at silica surface. Microcalimetry and adsorption." *Jcis* 2009, 333, 49-57.

Bjarne Johansson, Rauno Friman, Peter Denifl, and Jarl B. Rosenholm: "Influence of polymers on the emulsified hydrocarbon liquid and on the surfactant stabilized toluene/perfluoro-octane emulsions." *J. Dispersion Sci. Technol.* 2009, 30, 989-996.

Tanya Tsoncheva, Ljubomira Ivanova, Jessica Rosenholm, Mika Linden: "Cobalt oxide species supported on SBA-15, KIT-5 and KIT-6 mesoporous silicas for ethyl acetate total oxidation." *Applied Catalysis B: Environmental* 2009, 89, 365-374.

Alexander Leitner, Martin Sturm, Jan-Henrik Smått, Mikael Järn, Mika Lindén, Karl Mechtler, Wolfgang Lindner: "Optimizing the performance of tin dioxide microspheres for phosphopeptide enrichment." *Analytica Chimica Acta* 2009, 638, 51-57.

Jessica M. Rosenholm, Emilia Peuhu, John E. Eriksson, Cecilia Sahlgren, and Mika Lindén: "Targeted Intracellular delivery of hydrophobic agents using mesoporous hybrid silica nanoparticles as carrier systems." *Nanoletters* 2009, Vol. 9, 9, 3308-3311.

Thomas Sandberg, Matti Hotokka: "Conformational analysis of hydroxymatairesinol in aqueous solution with molecular dynamics." *J. Comput. Chem.* 2009, Vol.30, No 16, 2666-2673.

Janne Puputti, Hua Jin, Jessica Rosenholm, Hua Jiang, Mika Lindén: "The use of an impure inorganic precursor for the synthesis of highly siliceous mesoporous materials under acidic conditions." *Microporous and Mesoporous Materials* 2009, 126, 272-275.

Petri Pulkkinen, Jun Shan, Kirsi Leppänen, Ari Käsäkoski, Ari Laiho, Mikael Järn, and Heikki Tenhu: "Poly(ethylene imine) and tetraethylenepentamine as protecting agents for metallic copper nanoparticles." *Applied Materials & Interfaces* 2009, Vol. 1, No. 2, 519-525.

Viljami Pore, Mikko Ritala, Markku Leskelä, Tapio Saukkonen, and Mikael Järn: "Explosive crystallization in atomic layer deposited mixed titanium oxides." *Crystal Growth & Design* 2009, Vol. 9, No. 7, 2974-2978.

Sophie Lepoutre, Jan-Henrik Smått, Christel Laberty, H. Amenitsch, David Grosso, Mika Lindén: "Detailed study of pore-filling processes during nanocasting of mesoporous films using SnO₂/SiO₂ as a model system." *Microporous and Mesoporous Materials* 2009, 123, 185-192.

Susumu Y. Imanishi, Petri Kouvonen, Jan-Henrik Smått, Mikko Heikkilä, Emilia Peuhu, Andrey Mikhailov,

Mikko Ritala, Mika Lindén, Garry L. Corthals and John E. Eriksson: "Phosphopeptide enrichment with stable spatial coordination on a titanium dioxide coated glass slide." *Rapid Commun. Mass Spectrom.* 2009, 23, 3661-3667.

Janne Puputti, Mika Lindén: "Water stability of a cheap sol-gel-based adhesive." *Adsorption* 2009, 15, 329-335.

Monika Kuemmel, Jan-Henrik Smått, Cedric Boissière, Lionel Nicole, Clément Sanchez, Mika Lindén and David Grosso: "Hierarchical inorganic nanopatterning (INP) through direct easy block-copolymer templating." *J. Mater. Chem.* 2009, 19, 3638-3642.

Sophie Lepoutre, Béatrice Julián-López, Clément Sanchez, Heinz Amenitsch, Mika Lindén and David Grosso: "Nanocasted mesoporous nanocrystalline ZnO thin films." *J. Mater. Chem.* 2009, 20, 537-542.

Marek Kosmulski, Piotr Prochniak, Jarl B. Rosenholm: "Electrokinetic potentials of Al₂O₃ in concentrated solutions of metal sulfates." *Journal of Colloid and Interface Science* 2009, 338, 316-318.

Marek Kosmulski, Piotr Próchniak, Jarl B. Rosenholm: "Electrokinetic study of adsorption of ionic surfactants on titania from organic solvents." *Colloids and Surfaces A: Physicochemical and Engineering Aspects* 2009, 348, 298-300.

Per Dahlsten, Piotr Próchniak, Marek Kosmulski, Jarl Rosenholm: "Electrokinetic behavior of melamine-formaldehyde latex particles at moderate electrolyte concentration." *Journal of Colloid and Interface Science* 2009, 339, 409-415.

Marek Kosmulski, Piotr Prochniak, Jarl B. Rosenholm: "Electroacoustic study of titania at high concentrations of 1-2, 2-1 and 2-2 electrolytes." *Colloids and Surfaces A: Physico-chemical and Engineering Aspects* 2009, 345, 106-111.

Marek Kosmulski, Piotr Próchniak, and Jarl B. Rosenholm: "Letter: The IEP of carbonate-free neodymium(III) oxide." *Journal of Dispersion Science and Technology* 2009, 30, 589-591.

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Jessica M. Rosenholm, Emilia Peuhu, Laurel T. Bate-Eya, John E. Eriksson, Cecilia Sahlgren, Mika Lindén: "Cancer-Cell-Specific Induction of Apoptosis Using Mesoporous Silica Nanoparticles as Drug-Delivery Vectors". *Small, in press*.

Jessica M. Rosenholm, Cecilia Sahlgren, Mika Lindén: "Towards intelligent, targeted drug delivery systems using mesoporous silica nanoparticles – Opportunities & Challenges (Review)." *Nanoscale, submitted*.

Jessica M. Rosenholm, Cecilia Sahlgren, Mika Lindén: "Multifunctional mesoporous silica nanoparticles for combined therapeutic, diagnostic, and targeted action in cancer treatment (Review)." *Current Drug Targets, submitted*.

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Torvald Vestberg, Peter Denifl, Matt Parkinson, Carl-Eric Wilén : "Effects of External Donors and Hydrogen Concentration on Oligomer Formation and Chain End Distribution in Propylene Polymerization with Ziegler-Natta Catalysts", *Journal of Polymer Science Part A: Polymer Chemistry* 2010, in press, (published online: Dec 7 2009).

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4.3 Åbo Akademi reports (4)

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Hotokka Matti och Luojola Christina (eds.): Department of Physical Chemistry. Yearbook 2008.

Rosenholm Jarl och Luojola Christina (eds.): Graduate School of Materials Research. Courses 2009/10.

Rosenholm Jarl och Luojola Christina (eds.): FunMat/Annual Report 2008. ISSN 1797-2965.

4.4 Patents and patent applications (5)

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5. Visits and visitors

5.1 Visitors to FunMat

Aseyev Vladimir, Slovenia
Aubert Melanie, France
Baral Jayanta, India
Bazin Damien, France
Bonaboina Balakrishna, India
Dahlsten Per, Sweden
Duchanoy Alain, France
Dudkina Marina, Russia
Durand-Vidal Serge, France
He Ning, China
Duanmu Jie, China
Junkin Elizabeth, USA
Khajehein Mohammed, Iran
Kosmulski Marek, Poland
Li Ling, China
Liu Yang, China
Lloret Noémie, France
Maddox Franchessa, USA
Moore Casey, USA
Nasir Zeeshan, Pakistan
Norouzian Rafieh, Iran
Pahlevan Mahdi, Iran
Pawelec Weronica, Poland
Prelesnik Simona, Slovenia
Prochniak Piotr, Poland
Sahin Serap, Turkey
Said-Mohammed Cynthia, France
Sakeye Motolani, Nigeria
Salas Jeremy, France
Sarfraz Jawad, Pakistan
Tan Chen, China
Ufer Boris, Germany
Xu Qian, China
Xuehan He, China
Ziolowski Bartosz, Poland

5.2 Visitors from FunMat

Duchanoy Alain, Germany
Gunnelius Kristian, Australia
Jansson Fredrik, Germany
Johansson Bjarne, Poland
Lindén Mika, China
Rosenholm Jarl, Australia, New Zeeland
Rosenholm Jessica, China
Smått Jan-Henrik, USA
Strandman Satu, Canada
Österbacka Ronald, USA

6. Outreach

Radio

- 28.8. Radio X-trem. Interview with Jouko Peltonen
- 2.10. YLE uutiset/Tiede ja tekniikka. Interview with Jessica Rosenholm "Tulevaisuuden syöpälääkkeet kuin täsmäohjuksia."
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- 4-2009 Nordisk papperstidning: "Tryck elektronik på obestruket papper".
- 14.6. Satakunnan kansa, "Metsien visionäärit".
- 5.8. Helsingin Sanomat/ Vieraskynä, Jyrki Heino, Mika Lindén: "Nanopartikkelit vievät lääkkeen täsmällisesti solun sisään".
- 31.8. Helsingin Sanomat/Vieraskynä, Jouko Peltonen: "Toiminnalliset materiaalit luovat uusia käyttötapoja painotuotteille".

Other publications

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- 1) Mera nyttigt i matbutiken: Kost för förebyggande och behandling av cancer
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7. Prizes and awards

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