

NICOM3

3rd International Symposium on Nanotechnology in Construction Prague, Czech Republic, May 31- June 2, 2009

Hosted by: Faculty of Civil Engineering, Czech Technical University in Prague

Final Program (issued on May 19, 2009)

Day 1: Sunday 31st May 2009

Pre-registration and welcome reception

15:00-19:30 **Registration** desk opened
 17:45-18:00 **Z. Bittnar:**
 Opening and Invitation Talk
 18:00-19:00 **Welcome reception**

Day 2: Monday 1st June 2009 a.m.


7:30-9:00, 10:00-18:00 **Registration** desk opened

Plenary Session 1 (room A) – Co-chairmen: Z. Bittnar and P.J.M. Bartos

8:30-8:45 Opening Talk (CTU representative)
 8:45-9:10 **Invited lecture: P.J.M. Bartos:**
 Nanotechnology in Construction: A Roadmap for Development

 9:10-9:45 **Invited lecture: J. Lee, S. Mahendra and P.J.J. Alvarez:**
 Potential Environmental and Human Health Impacts of Nanomaterials Used in the Construction Industry

 9:45-10:20 **Invited lecture: H. Jennings:**
 The Colloid/Nanogranular Nature of Cement Paste and Properties

 10:20-10:40  **Coffee break**

Session A1- Nanostructure Characterization

Co-chairmen: **B.J. Mohr and W. Zhu**

10:40-11:05 **Keynote:** J.O. Ojo and **B.J. Mohr:**
 A Review of the Analysis of Cement Hydration Kinetics via ¹H Nuclear Magnetic Resonance
 11:05-11:30 **Keynote:** **J.S. Schweitzer** et al.:
 Progress in Nanoscale Studies of Hydrogen Reactions in Construction Materials
 11:30-11:45 **W. Zhu, M.T.J. Fonteyn, J. Hughes and C. Pearce :**
 Nanoindentation Study of Resin Impregnated Sandstone and Early-Age Cement Paste Specimens
 11:45-12:00 **P. Mondal, S.P. Shah and L.D. Marks:**
 Nanomechanical Properties of Interfacial Transition Zone in Concrete
 12:00-12:15 **S.F. Lee, J.Y. He, X.H. Wang, Z.L. Zhang and S. Jacobsen:**
 Study of P-h Curves on Nanomechanical Properties of Steel Fiber Reinforced Mortar

12:30-14:00  **Lunch**

Session B1- Nanoadditives

Co-chairmen: **K. Sobolev and K.E. Kurtis**

10:40-11:05 **Keynote:** **K. Sobolev** et al.:
 Engineering of SiO₂ Nanoparticles for Optimal Performance in Nano Cement-Based Materials
 11:05-11:20 **M.R. Kessler** and W.K. Goertzen:
 Polymer Nanocomposites for Infrastructure Rehabilitation
 11:20-11:35 **A.R. Jayapalan, B.Y. Lee and K.E. Kurtis:**
 Effect of Nano-Sized Titanium Dioxide on Early Age Hydration of Portland Cement
 11:35-11:50 **M. M. Alavi Nikje, A. Bagheri Garmarudi, M. Haghshenas and Z. Mazaheri:**
 Improving the Performance of Heat Insulation Polyurethane Foams by Silica Nanoparticles
 11:50-12:05 **M.M. Alavi Nikje, M. Khanmohammadi and A. Bagheri Garmarudi:**
 Interpretation of Mechanical and Thermal Properties of Heavy Duty Epoxy Based Floor Coating Doped by Nanosilica
 12:05-12:20 **M.R. Taha:**
 Geotechnical Properties of Soil-Ball Milled Soil Mixtures

Session A2- Innovations, Energy Savings and Sustainable Development

Co-chairmen: L. Raki and M.M. Andersen

- 14:00-14:25 **Keynote:** L. Raki, J.J. Beaudoin and R. Alizadeh:
Nanotechnology Applications for Sustainable Cement-Based Products
- 14:25-14:50 **Keynote:** E.J. Garboczi:
Concrete nanoscience and nanotechnology: Definitions and applications
- 14:50-15:05 **M.M. Andersen** and M.R. Geiker:
Nanotechnologies for Climate Friendly Construction – Key Issues and Challenges
- 15:05-15:20 **F.H. Halicioglu:**
The Potential Benefits of Nanotechnology for Innovative Solutions in the Construction Sector
- 15:20-15:35 **Keles Y.** et al.:
Economic impacts of Nanotechnology in Construction Sector
- 15:35-15:50 **M.M. Andersen** and M. Molin:
Eco-innovation Strategies in the Construction Sector: Impacts on Nanotech Innovation in the Window Chain
- 15:50-16:05 **T. Kitisriworaphan** and Y. Sawangdee:
Nanotechnology Divides: Development Indicators and Thai Construction Industry



16:00-16:30 Coffee break

Session A3- Self-cleaning, TiO₂ and Health Hazards of Nanoparticles

Co-chairmen: J. Zeman and G. Hüsken

- 16:30-16:55 **Keynote:** G. Bolte:
Innovative Building Material – Reduction of Air Pollution through TioCem®
- 16:55-17:10 **G. Hüsken**, M. Hunger, M. M. Ballari and H.J.H Brouwers:
The Effect of Various Process Conditions on the Photocatalytic Degradation of NO
- 17:10-17:25 **Q.L. Yu**, H. J.H. Brouwers and M.M. Ballari:
Experimental Study and Modeling of the Photocatalytic Oxidation of NO in Indoor Conditions
- 17:25-17:40 **W. Wang** et al.:
Spray Deposition of Au/TiO₂ Composite Thin Films Using Preformed Nanoparticles
- 17:40-17:55 **W. Musikaphan** and T. Kitisriworaphan:
Possible Impacts of Nanoparticles on Children of Thai Construction Industry

20:00-23:00 Symposium Dinner

Session B2- Nanofilaments, Fibers and CNT

Co-chairmen: N. Silvestre and S. Inoue

- 14:00-14:25 **Keynote:** O. Jirsák and T.A. Dao:
Production, Properties and End-uses of Nanofibres
- 14:25-14:40 **T. Kowald** and R. Trettin:
Improvement of Cementitious Binders by Multi-Walled Carbon Nanotubes
- 14:40-14:55 **A. Cwirzen** et al.:
CHH Cement Composite
- 14:55-15:10 **J. Vera-Agullo** et al.:
Mortar and Concrete Reinforced with Nanomaterials
- 15:10-15:25 **N. Silvestre** and D. Camotim:
Stability of Compressed Carbon Nanotubes Using Shell Models
- 15:25-15:40 **N. Silvestre** and D. Camotim:
Bending Instabilities of Carbon Nanotubes
- 15:40-15:55 **S. Inoue** and Y. Matsumura:
Molecular Dynamics Approach for the Effect of Metal Coating on Single-Walled Carbon Nanotube

Session B3- CNT, Coatings, Foams and Aerogels

Co-chairmen: S.P. Shah and M. Kutschera

- 16:30-16:55 **Keynote:** S.P. Shah, M.S. Konsta-Gdoutos, Z.S. Metaxa and P. Mondal:
Nanoscale Modification of Cementitious Materials
- 16:55-17:10 **F. Sanchez**, L. Zhang and C. Ince:
Multi-Scale Performance and Durability of Carbon Nanofiber/Cement Composites
- 17:10-17:25 **N. Yazdani** and T. Manzur:
Effect of Carbon Nanotubes on the Properties of Cement Mortar
- 17:25-17:40 **F. Scalisi:**
Nano-Structured Materials in New and Existing Buildings: To Improved Performance and Saving of Energy
- 17:40-17:55 **M. Kutschera**, T. Breiner, H. Wiese, M. Leith and M. Bräu:
Nano-Modification of Building Materials for Sustainable Construction
- 17:55-18:10 **J.F. Muñoz**, J.M. Sanfilippo, M.I. Tejedor, M.A. Anderson and S.M. Cramer:
Mitigation of Leachates in Blast Furnace Slag Aggregates by Application of Nanoporous Thin Films

Day 3: Tuesday 2nd June 2009 a.m.

8:00-12:00 Registration desk opened

Plenary Session 2 (room A) – Co-chairmen: H. Jennings and P.J.J. Alvarez

9:10-9:45 **Invited lecture: F.-J. Ulm** and M. Vandamme:
Probing Nano-Structure of C-S-H by Micro-Mechanics Based Indentation Techniques

9:45-10:20 **Invited lecture: K.L. Scrivener:**
Nanotechnology and Cementitious Materials

10:20-10:50  **Coffee break**

Session A4- Multiscale Modeling

Co-chairmen: **C. Hellmich** and **G. Constantinides**

10:50-11:15 **Keynote:** S. Scheiner and **C. Hellmich:**
Continuum Microviscoelasticity Model for Cementitious Materials: Upscaling Technique and First Experimental Validation

11:15-11:40 **Keynote:** **G. Constantinides**, J.F Smith and F.-J. Ulm:
Nanomechanical Explorations of Cementitious Materials: Recent Results and Future Perspectives

11:40-11:55 **J.J. Gaitero**, W. Zhu and I. Campillo:
Multi-Scale Study of Calcium Leaching in Cement Pastes with Silica Nanoparticles

11:55-12:10 **D. Davydov** and M. Jirásek:
Modeling of Nanoindentation by a Visco-Elastic Porous Model with Application to Cement Paste

12:10-12:25 **E. Cerro-Prada** et al.:
Nanoscale Agent Based Modelling for Nanostructure Development of Cement

12:20-13:30  **Lunch**

13:30-13:45  **Group Photo** of all participants at the front entrance to the Faculty of Civil Engineering

Poster Session 13:45-14:30

M.M. Ballari et al.:

T. Ebadzadeh and L. Sharifi:

V. Matějka et al.:

R. Sadeghi Doodaran and M. Pasbani Khiavi:

L.P. Singh, S.K. Agarwal and Saurabh Ahlawat:

J. Zelić, D. Jozić, D. Krpan-Lisica:

Heterogeneous Photocatalysis Applied to Concrete Pavement for Air Remediation

Synthesis of α -Al₂O₃ Nanopowder by Microwave Heating of Boehmite Gel

Utilization of Photoactive Kaolinite/TiO₂ Composite in Cement-Based Building Materials

Effects of Sabalan Tuff as a Natural Pozzolan on Properties of Plastic Concrete

Synthesis & Applications of Nano-Silica for the Understanding of Calcium-Silicate-Hydrate System

Synergistic Action of a Ternary System of Portland Cement – Limestone – Silica Fume in Concrete

Session B4- Cement Hydration and UHPC

Co-chairmen: **J. S. Schweitzer** and **U. Müller**

10:50-11:15 **Keynote:** **R.A. Livingston**, W. Bumrongjaroen and A.J. Allen:
The Fractal Ratio as a Metric of Nanostructure Development in Hydrating Cement Paste (talk will be given by **J. S. Schweitzer**)

11:15-11:30 **V. Spaeth**, J.P.Lecomte, T. Buttner and M.P.Delplancke-Ogletree:
Waterrepellent cement materials: Hydration process and Nanostructure development

11:30-11:45 **D. Lowke** :
Interparticle Forces and Rheology of Cement Based Suspensions

11:45-12:00 **A. García-Luna** et. al.:
Activation Effect by Micro/Nano cements on OPC Based Structures

12:00-12:15 C. Lehmann, P. Fontana and **U. Müller:**
Evolution of Phases and Micro Structure in Hydrothermally Cured Ultra-High Performance Concrete (UHPC)

12:15-12:30 **T. Stengel:**
Effect of Surface Roughness on the Steel Fibre Bonding in Ultra High Performance Concrete (UHPC)

Session A5- Metrology, Sensor Technologies and Probabilistic modeling

Co-chairmen: J.E. Decker and J.P. Lynch

- 14:30-14:55 **Keynote:** J.E. Decker et al.:
Developments in Metrology in Support of Nanotechnology
- 14:55-15:10 **J.P. Lynch**, K.J. Loh, T.-C. Hou and N. Kotov:
Nanocomposite Sensing Skins for Distributed Structural Sensing
- 15:10-15:25 **L. Sorelli** et al. :
FOSM Statistical Nanoindentation Techniques applied to Cementitious Composites
- 15:25-15:40 Arun Krishnan and **L. Roy Xu**:
Uncertain Mechanical Properties and Reliability of Nanocomposite Materials

15:40 Closing of the Symposium

Session B5- Alternative Aluminosilicate Binders

Co-chairmen: J.L. Provis and V. Šmilauer

- 14:30-14:55 **Keynote:** J.L. Provis et al.:
Analysing and manipulating the nanostructure of geopolymers
- 14:55-15:10 C. Ruiz-SantaQuiteria, **A. Fernández-Jiménez**, A. Palomo:
Alkali activation of aluminosilicates
- 15:10-15:25 **J. Němeček**, V. Šmilauer and L. Kopecký:
Characterization of Alkali-activated Fly-ash by Nanoindentation
- 15:25-15:40 **I. Beleña** and W. Zhu:
Nanoindentation Study of Na-Geopolymers Exposed to High Temperatures