

Program

Geopolymers: The route to eliminate waste and emissions in ceramic and cement manufacturing

**May 24-29, 2015
Hernstein, Austria**

Conference Chair

Prof. Cristina Leonelli
University of Modena and Reggio Emilia, Italy

Conference Co-Chairs

Prof. Waltraud M. Kriven
University of Illinois at
Urbana-Champaign, USA

Prof. Aldo R. Boccaccini
University of Erlangen-Nuremberg, Germany

Prof. Arie van Riessen
Curtin University, Australia



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Cyril Attwell, Murray & Roberts Construction Group Services, South Africa

Caijun Shi, Hunan University/China Building Materials Academy, China

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Sunday, May 24, 2015

16:00 – 18:00	Conference Check-in
18:00 – 18:30	Introduction Conference Chairs (C. Leonelli, W. Kriven, A.R. Boccaccini, A. van Riessen) and ECI Liaison
18:30 – 19:30	Opening Plenary Speech The development of geopolymer science and technologies Josef Davidovits, Geopolymers Institute, France
19:30	Welcome Reception with wine tasting in Historic Area
20:30	Dinner

Notes

- *Technical sessions will be in the Studio.*
- *Poster Sessions will be in the Hofsuite 1-2.*
- *Meals will be held in the Panorama Restaurant.*
- *Audiotaping, videotaping and photography of presentations are prohibited.*
- *Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).*
- *Speakers – Please leave at least 3-5 minutes for questions and discussion.*
- *Please do not smoke at any conference functions.*
- *Turn your mobile telephones to vibrate or off during technical sessions.*
- *Please write your name on your program so that it can be returned to you if lost or misplaced.*
- *After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.*

Monday, May 25, 2015

07:30 – 08:30 Breakfast buffet

SESSION I: FUNDAMENTALS OF GEOPOLYMERS CHEMISTRY

Session Chair: Cristina Leonelli, University of Modena and Reggio Emilia, Italy

08:30 – 09:00 **Keynote**
Effect of non bridging oxygen atoms of alkaline solution in geopolymer formation
Sylvie Rossignol, CEC SPCTS, France

09:00 – 09:20 **Characterization and classification of precursors for alkali-activated materials (AAMs)**
Caijun Shi, Hunan University, China

09:20 – 09:40 **Use of clay sediment and water purification sludge in the manufacture of geopolymer building blocks**
Raffaele Cioffi, Partenope University, Italy

09:40 – 10:00 **Correcting for aluminium in bentonite**
Ines García-Lodeiro, IETcc-CSIC, Spain

10:00 – 10:20 **Influence of gibbsite and quartz in kaolin on the properties of metakaolin-based geopolymer cements**
Herve Tchakoute Kouamo, Univeristy of Yaounde 1, Cameroon

10:20 – 10:50 Coffee break

SESSION II: STRUCTURE AND KINETICS OF GEOPOLYMERS

Session chair: John L. Provis, University of Sheffield, United Kingdom

10:50 – 11:20 **Keynote**
²⁷Al and ²⁹Si MAS-NMR study of species dissolved in alkali-activated fly ash
Ana Fernández, IETcc-CSIC, Spain

11:20 – 11:40 **Geopolymerization from liquid state to porous material**
Fabien Frizon, CEA Marcoule, France

11:40 – 12:00 **Effect of mechanical activation of fly ash on geopolymer properties**
Zoltán Molnár, University of Miskolc, Hungary

12:00 – 12:20 **Reaction kinetics study of fly ash geopolymer**
Susanta Kumar Nath, CSIR-National Metallurgical Laboratory, India

12:30 – 14:00 Lunch

14:00 – 15:00 **Round Table: Scientific journals on cement or geopolymers**
Moderator: Francisca Puertas, IETcc-CSIC, Spain, Editor-In-Chief of “Materiales de Construcción” Journal
Speakers: Caijun Shi, Editor-In-Chief of “Journal of Sustainable Cement-Based Materials”; Yiannis Pontikes Managing Editor of “Journal of Sustainable Metallurgy”.

Monday, May 25, 2015 (continued)

SESSION III: PROPERTIES AND PERFORMANCE OF GEOPOLYMERS

Session chair: Aldo R. Boccaccini, University of Erlangen-Nuremberg, Germany

Keynote

15:00 – 15:30

Novel hybrid materials based on polysiloxanes and geopolymers

Raffaele Cioffi, Partenope University, Italy

15:30 – 15:50

Fire resistant fly ash-based geopolymers

Les Vickers, Curtin University, Australia

15:50 – 16:10

Potential of secondary resources as aluminium-silicate precursors for geopolymer synthesis

Siska Valcke, TNO, The Netherlands

16:10 – 16:30

Coffee break

16:30 – 19:30

ROUND TABLE: DURABILITY OF GEOPOLYMERS

Moderator: John L. Provis coordinator RILEM TC 247-DTA

Speakers: List to be defined

19:30 – 20:45

Dinner

20:45 – 22:00

Poster Session with Social Hour

Tuesday, May 26, 2015

07:30 – 08:30 Breakfast buffet

SESSION IV: GEOPOLYMERS IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

Session chair: Caijun Shi, Hunan University, China

08:30 – 09:00 **Keynote**
Hydrothermal and long-duration ambient curing of metakaolin based geopolymers
John L. Provis, University of Sheffield, United Kingdom

09:00 – 09:20 **Effect of curing conditions on crystalline phase development of heat-treated K/Cs geopolymer**
Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA

09:20 – 09:40 **Waste glass powder as partial binder precursor in geopolymer paste: A study on glass reactivity and gel formation**
Shizhe Zhang, Delft University of Technology, The Netherlands

09:40 – 10:00 **Recycling influence on geopolymer formation**
Najet Essaidi, Ecole Nationale Supérieure De Ceramiques Industrielle, France

10:00 – 10:20 **Effect of alkaline activators to immobilize lead in fly ash-based geopolymers**
Sujeong Lee, Korea Institute of Geoscience and Mineral Resources, Korea

10:20 – 10:50 Coffee break

SESSION V: GEOPOLYMERS IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

Session chair: Raffaele Cioffi, Partenope University, Italy

10:50 – 11:20 **Keynote**
Ashes from biomass incineration as alternative activator for inorganic polymers
Hubert Rahier, Vrije Universiteit Brussels, Belgium

11:20 – 11:40 **Recycling mineral wool waste in geopolymers**
Paivo Kinnunen, University of Oulu, Finland

11:40 – 12:00 **Basalt chopped fiber, felt and weave reinforced geopolymer composites**
Daniel Ribero Rodriguez, University of Illinois at Urbana-Champaign, USA

12:00 – 12:20 **Short carbon fiber-reinforced, potassium geopolymer composites**
Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA

12:20 – 12:40 **Lignocellulosic fibers as reinforcements in geopolymers**
Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA

12:40 – 14:00 Lunch

14:00 – 15:20 Free time

15:20 – 15:50 Coffee break

Tuesday, May 26, 2015 (continued)

SESSION VI: GEOPOLYMERS IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

Session Chair: Jannie S.J. van Deventer, Zeobond Pty Ltd., Australia

- 15:50 – 16:20 **Keynote**
Geopolymers using glass produced from the dc plasma treatment of air pollution control (APC) residues: overview and challenges
Aldo R. Boccaccini, University of Erlangen-Nuremberg, Germany
- 16:20 – 16:40 **Fe-Al substitution in inorganic polymers derived from vitreous precursors**
Lieven Machiels, KU Leuven, Belgium
- 16:40 – 17:00 **Geopolymer preparation through waste glass as new alternative alkaline activator mechanical and microstructural behavior**
Manuel Torres-Carrasco, Eduardo Torroja Institute for Construction Sciences, Spain
- 17:00 – 17:20 **Design and characterization of fly ash-based geopolymer concretes for a round-robin durability testing program**
Gregor J. G. Gluth, BAM Federal Institute for Materials Research and Testing, Germany
- 17:20 – 17:40 **On the durability of steel reinforced geopolymer concrete in marine environments**
Mahdi Babaei, University of New South Wales, Australia
- 17:45 – 19:45 **STUDENT CONTEST (*Flash presentations followed by poster session*)**
Session Chairs: Arie van Riessen, Curtin University, Australia
- 19:45 – 21:00 Dinner
- 21:00 – 22:00 **Poster Session** with Social Hour

Wednesday, May 27, 2015

07:30 – 08:30 Breakfast buffet

SESSION VII: RHEOLOGY AND WORKABILITY OF GEOPOLYMERS

Session chair: Angel Palomo, Eduardo Torroja Institute CSIC, Spain

08:30 – 09:00

Keynote

Influence of viscosity on geopolymer porosity

Marcello Romagnoli, University of Modena and Reggio Emilia, Italy

09:00 – 09:20

Rheological behavior of a Na-geopolymer

Arnaud Poulesquen, CEA Marcoule, France

09:20 – 09:40

Experimental study of workability of geopolymer concretes made of fly ash and blast furnace slag

Kamel Arbi, Delft University of Technology, CITG, the Netherlands

09:40 – 10:00

Influence of formulation parameters and evolution of geopolymer porosity

Virginie Benavent, CEA/DEN/DTCD/SPDE/LP2C, France

10:00 – 10:30

Coffee break

SESSION VIII: GEOPOLYMERS IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

Session chair: Francisca Puertas, IETcc-CSIC, Spain

10:30 – 11:00

Keynote

Inorganic polymers from residues of high temperature processes: Going beyond the aluminosilicates

Yiannis Pontikes, KU Leuven, Belgium

11:00 – 11:20

Utilization of sustainable materials for soil stabilization: State-of-the-art

Prathyusha N.V. Jayanthi, IIT Bombay, India

11:20 – 11:40

Metakaolin and fly ash based geopolymers compared with cementitious mortars of the same strength class: Performances and corrosion behavior of black and galvanized steel bars

Alessandra Mobili, Universita Politecnica Delle Marche, Italy

11:40 – 12:00

Alkali activation of industrial by-products with high lime content

Stavroula Konopisi, Aristotle University of Thessaloniki AUTH, Greece

12:15

Boxed lunch / Pick up boxed lunch for those going on excursion to Vienna

12:30 – 18:00

Optional excursion to Vienna

Free time

18:30 – 19:30

Poster Session

19:30 – 21:00

Dinner

21:00 – 22:00

Social Hour

Thursday, May 28, 2015

07:30 – 08:30 Breakfast buffet

SESSION IX: FROM GEOPOLYMERS TO COMPLEX CERAMICS

Session Chair: William Rickard, Curtin University, Australia

08:30 – 09:00

Keynote

Microstructural investigation of carbothermally reacted geopolymer composites, made under specific alkaline conditions

Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA

09:00 – 09:20

Transformation of the geopolymer gels to crystalline bonds in cold-setting refractory concretes: pore evolution, mechanical strength and microstructure

Elie Kamseu, University of Modena and Reggio Emilia, Italy

09:20 – 9:40

Development of lightweight insulating building materials

Georgia-Maria Tsaousi, National Technical University of Athens, Greece

9:40 – 10:00

Comparison of fibres in geopolymer matrix for structural reinforcement of masonry (FRGP): Compatibility, reactivity, durability

Sergio Tamburini, National Research Council, Italy

10:00 – 10:30

Coffee break

SESSION X: FROM GEOPOLYMERS TO COMPLEX CERAMICS

Session chair: Gregor Gluth, German Federal Institute for Materials Research and Testing

10:30 – 11:00

Keynote

In-situ thermo-mechanical testing of fly ash geopolymer concretes made with quartz and expanded clay aggregates

William Rickard, Curtin University, Australia

11:00 – 11:20

Low cost synthesis of sialon type ceramic powders from Na, K or Cs geopolymer

Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA

11:20 – 11:40

High temperature mechanical properties of mullite and alumina fiber reinforced geopolymer composites

Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA

11:40 – 12:00

The effect of heat-curing on mechanical properties of slag blended fly ash based geopolymer concrete

Amin Noushini, University of New South Wales, Australia

12:30 – 14:00

Lunch

SESSION XI: CO₂ BREAKTHROUGH IN MATERIALS VS GEOPOLYMER PRODUCTION

Session chair: Hubert Rahier, Vrije Universiteit Brussel, Belgium

14:00 – 14:30

Keynote

Is more R&D required for commercial adoption of geopolymers?

Jannie S.J. van Deventer, Zeobond Pty Ltd., Australia

Thursday, May 28, 2015 (continued)

- 14:30 – 14:50 **Geopolymer concrete: A practical approach**
Cyril Attwell, Murray & Roberts Construction Group Services, South Africa
- 14:50 – 15:10 **Geomaterial for industrial sanitary use**
Sylvie Rossignol, CEC SPCTS, France
- 15:10 – 15:45 Coffee break
- 15:45 – 18:30 ***ROUND TABLE: INDUSTRIAL APPLICATIONS OF GEOPOLYMERS***
Moderator: Jannie S.J. van Deventer, Zeobond Pty Ltd, Australia
Speakers: Angel Palomo-IETCC-CSIS, Spain; Cyril Attwell-Murray & Roberts (Pty) Ltd, South Africa; Scientific Research Institute for Binders and Materials; Yiannis Pontikes- KU Leuven, Belgium; and others
- 18:30 – 20:00 Free time
- 20:30 Conference Banquet

Friday, May 29, 2015

07:30 – 08:30 Breakfast buffet

SESSION XII: GEOPOLYMERS AND WASTE IMMOBILIZATION

Session chair: Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA
Jay Sanjayan, Swinburne University of Technology, Australia

- 08:30 – 09:00 **Keynote**
Applicability of alkali activated cements for immobilization of low-level radioactive ion exchange resins
Hailin Cao, Shenzhen Academy of Aerospace Technology, China
- 09:00 – 09:20 **Structuration of an organic liquid oil/geopolymer composite**
Vincent Cantarel, CEA Marcoule, France
- 09:20 – 09:40 **Applying geopolymer technology to soil injection grouts**
Anass Cherki El Idrissi, Ecole Centrale De Nantes, France
- 09:40 – 10:10 Coffee break
- 10:10 – 10:30 **Geopolymers: A new route to inertize chromium liquid waste exploiting its water content**
Isabella Lancellotti, University of Modena and Reggio Emilia, Italy
- 10:30 – 10:50 **Innovative materials for passive fire protection of tunnels**
Dimitrios Panias, National Technical University of Athens, Greece
- 10:50 – 11:10 **Potassium geopolymer reinforced with granite and chamotte powder**
Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA
- 11:10 – 11:40 **Conclusions**
(Next conference, industrial involvement, publications, projects, educational matters, etc.)
- 12:00 Lunch and departures

Geopolymers

May 24 – 29, 2015
Hernstein, Austria

Poster Presentation List

1. **Alkaline silicate solutions properties and their effect on sand agglomeration**
Sylvie Rossignol, CEC SPCTS, France
2. **Developing a geopolymer based coating for use in self-healing concrete**
Henk W. Nugteren, Delft University of Technology, the Netherlands
3. **Simultaneous alkali activation and high shear granulation**
Juho Yliniemi, University of Oulu, Finland
4. **Effect of curing conditions on the properties of alkali-activated slag**
Olesia Mikhailova, Brno University of Technology, Czech Republic
5. **Mica platelet-reinforced, geopolymer composites**
Patrick Keane, University of Illinois at Urbana-Champaign, USA
6. **Comparison of fibers in geopolymer matrix for structural reinforcement of masonry (FRGP): Compatibility, reactivity, durability**
Sergio Tamburini, National Research Council, Italy
7. **Properties of inorganic polymer cement from ferric and ferrous vitrified residues of plasma gasification**
Lukas Arnout, KU Leuven, Belgium
8. **Low CO₂ binder from CFBC fly ash: Model of phase evolution during hydration**
Peter Hlavacek, Czech Technical University in Prague, Czech Republic