



# First International Conference on Accelerated Carbonation for Environmental and Materials Engineering

## Final Programme

12 –14<sup>th</sup> June 2006

The Royal Society

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Minerals and Mining



Meeting organised by  
*Cement & Concrete Science*

## Programme

### MONDAY

09.00-10.25 REGISTRATION

10.25-10.30 CHAIRMANS INTRODUCTION C Hills

### SUPER-CRITICAL CARBONATION

#### Chairman: K Gardner

10.30-10.55 **Super-critical carbonation of glass fibre reinforced cements – A review**  
*N R Short, P Purnell and C L Page*  
Aston University, Birmingham, University of Warwick and University of Leeds., UK

10.55-11.20 **Mortars processed using  $\text{sco}_2$ : Applications in nuclear waste storage-systems**  
*A Hidalgo\*, C Domingo, C García, C Andrade and C Alonso*  
Instituto de Ciencias de la Construcción Eduardo Torroja (CSIC), Madrid & Instituto de Ciencia de Materiales de Barcelona (CSIC), Bellaterra., Spain

11.20-11.45 **Advanced calcareous ceramics via novel green processing and super-critical carbonation**  
*E Farahi and P Purnell*  
University of Warwick, UK

11.45-12.10 **The effects of supercritical carbon dioxide on new calcium-silica materials**  
*SJ Shaw, CL Page, A R Brough, M M Page, T R Jones and M Carsana*  
University of Leeds, UK

12.10-12.20 Discussion

12.20-13.45 LUNCH

### SOILS TREATED BY CARBONATION

#### Chairman: C Hills

13.45- 14.10 **Effects of atmospheric and leachant carbonation on retention of contaminants in cement-based waste forms**  
*A C Garrabrants\*, H A van der Sloot, J C L Meeussen & D S Kosson*  
Vanderbilt University, Nashville, TN and ECN - the Netherlands  
Energy Research Foundation, Petten, the Netherlands.

14.10-14.35 **Geochemical properties of carbonated and non-carbonated solidified/stabilised soils**  
*J Liu\*, D Boardman, C D F Rogers, C D Hills, P J Carey and K H Gardner*  
University of Birmingham, UK, University of Greenwich, UK and University of New Hampshire, USA

- 14.35-15.00**      **Accelerated carbonation of contaminated sediments and its application**  
*J S Melton and K M Tarabadkar*  
Recycled Materials Resource Center, Durham, USA
- 15.00-15.25**      **Physico-chemical properties of accelerated carbonated clays**  
*L Barnard, C D Hills, D Boardman, C Rogers and P J Carey*  
University of Birmingham and University of Greenwich, UK
- 15.25-16.0**        **TEA**

## **STUDIES ON THE CARBONATION OF MSWI RESIDUES I**

**Chairman: T Shimaoka**

- 16.00-16.25**      **Effect of carbonation on pH dependent leaching of MWSI bottom ash**  
*J-P Brouwer, L Feenstra, E Mulder, J van Aalten, S Rutten and A de Bode*  
TNO, The Netherlands
- 16.25-16.50**      **In-situ carbonation of MSWI bottom ash and solidified incineration residues a case study**  
*P Mostbauer and P Lechner*  
Institute of Waste Management, Vienna, Austria
- 16.50-17.15**      **Progress of carbonation on landfilled MSWI Incineration residues**  
*J Etoh, T Shimaoka, R Zhang and T Haraguchi*  
Kyushu University, Japan
- 17.15-17.40**      **Accelerated carbonation of incinerator fly ash**  
*X Li, C D Hills and P J Carey*  
University of Greenwich, UK
- 17.40-17.50**      **Discussion**
- 17.50**              **CLOSE**

TUESDAY

**ACCELERATED CARBONATION OF MINERALS**

**Chairman: P Carey**

- 09.15-9.40**      **Carbon sequestration using recycled materials under ambient atmospheric conditions**  
*K Gardner, J. Leipold, J. Melton, T.T. Eighmy and T.P. Seager*  
*University of New Hampshire and Purdue University, USA*
- 09.40-10.05**      **Mineral carbonation for CO<sub>2</sub> storage**  
*J-P Brouwer and P H M Feron*  
TNO, The Netherlands
- 10.05-10.30**      **Treatment of acid mine waters with carbonated calcium silicates**  
*J Tendo\*, C D Hills and P J Carey*  
University of Greenwich, UK and University of Buea, Cameroon
- 10.30-10.40**      **Discussion**
- 10.40-11.0**        **COFFEE**

**STUDIES ON THE CARBONATION OF MSWI INCINERATOR RESIDUES II**

**Chairman: J Brouwer**

- 11.00-11.25**      **Carbonation Treatment of Lead in Municipal Solid Waste Incineration Bottom Ash for Beneficial Use**  
*S Sakita, T Shimaoka, M Nishigaki and T Tanaka*  
Kyushu University, Takuma Co. and Hitachi Zosen Corp., Japan
- 11.25-11.50**      **Accelerated carbonation for immobilization of lead in municipal solid waste bottom ash**  
*T Shimaoka, R Zhang, J Lee, S Sakita and J Etoh*  
Kyushu University and National Institute for Environmental Studies., Japan
- 11.50-12.15**      **The effect of carbonation on antimony leaching from mswi bottom ash**  
*G Cornelis\*, T Van Gerven and C VandecAstele*  
Department of Chemical Engineering, K.U.Leuven, Heverlee, Belgium
- 12.15-12.25**      **Discussion**
- 12.25-14.00**      **LUNCH**

## **CARBONATION OF LIME, CEMENT AND CONCRETE**

**Chairman: A Polletini**

- 14.00-14.25**      **CO<sub>2</sub> - uptake in concrete**  
*Jesper Sand Damtoft*  
*Research and Development Centre, Aalborg Portland A/S, DK*
- 14.25-14.50**      **A pilot-scale carbon-sequestering roadway embankment made from recycled concrete fines**  
*K Gardner, S. Greenwood and J. Leipold*  
*University of New Hampshire, USA*
- 14.50-15.15**      **Carbonation reaction of lime and lime-pozzolan pastes at 20°C**  
*O Cizer, K Van Balen, J Elsen and D Van Gemert\**  
*K.U.Leuven, Heverlee, Belgium*
- 15.15-15.40**      **Carbonation - The early stages**  
*T.Matschei and F P Glasser*  
*University of Aberdeen*
- 15.40-16.50**      **Discussion**
- 15.50-16.10**      **Tea**
- 19.00**              **CONFERENCE DINNER**

## WEDNESDAY

### PHYSICAL WASTE STABILISATION/CHEMICAL WASTE STABILISATION

**Chairman: F Glasser**

- 09.15-09.40**      **Leaching properties of contaminated marine sediments stabilised with hydrated cement versus carbonated cement**  
*K Gardner, J. Melton, Cécile Pouly and C.D. Hills*  
University of New Hampshire, USA, Ecole Centrale de Nantes, France, and University of Greenwich, UK
- 09.40-10.05**      **Weathering of accelerated carbonated contaminated soil- Review of results from 5 years exposure**  
*A Antimir, C D Hills and P J Carey*  
University of Greenwich, UK
- 10.05-10.30**      **Influence of the degree of carbonation on leaching from cement-bound waste-containing cement matrices**  
*T Van Gerven\*, G Cornelis, A C Garrabrants, F Sanchez, D S Kosson & C Vandecasteele*  
K.U.Leuven, Belgium and Vanderbilt University, Nashville, USA
- 10.30-10.40**      **Discussion**
- 10.40-11.00**      **Coffee**

### STUDIES ON THE CARBONATION OF MSWI INCINERATOR RESIDUES III

**Chairman: P Purnell**

- 11.00-11.25**      **Kinetic studies of carbonation of MSWI ash**  
*Fernandez-Bertos, S Simons, C D Hills and P J Carey*  
University of Greenwich & University College London, UK
- 11.25-11.50**      **Accelerated gas/solid carbonation of incinerator residues: kinetics and effects on metal mobility**  
*R Baciocchi, A Polettini, R Pomi and V Prigiobbe*  
University of Rome "La Sapienza", Italy
- 11.50-12.15**      **A process for accelerated carbonation of MSWI bottom ash**  
*J Steketee*  
Tauw NL, Netherlands
- 12.15-12.25**      **Discussion**
- 12.25-14.0**      **LUNCH**

## MISCELANEOUS

**Chairman: S Simons**

- 14.00-14.25**      **The effect of carbonation on the Nirex phased geological repository concept**  
*J. Hill*  
UK Nirex Ltd, Curie Avenue, Harwell, UK
- 14.25-14.50**      **Artificial weathering of Waelz slags**  
*G. Cappai, C. Dettori, P. Mostbauer, A. Muntoni*  
DIGITA, University of Cagliari, Italy and Institute of Waste Management, Department of Water, Atmosphere and Environment, BOKU-University of Natural Resources and Applied Life Sciences, Vienna, Austria
- 14.50-15.15**      **Effect of water content on CO<sub>2</sub> uptake of clays**  
*L Barnard, D Boardman, and C Rogers*  
University of Birmingham, UK
- 15.15-15.25**      **Discussion**
- 15.30**              **Closing remarks**