

## 2<sup>nd</sup> International Workshop

### Mechanisms and modelling of waste/cement interactions

October 12-16, 2008  
Le Croisic/France

#### FINAL PROGRAMME

#### Sunday, October 12, 2008

- 18:15      **Registration**
- 19:45      **Welcoming Cocktail**
- 20:30      **Dinner**

#### Monday, October 13, 2008

##### Morning session : Topic 1 Cement chemistry

*Chairpersons* : Urs Berner (PSI)  
                  André Nonat (CNRS/Université de Bourgogne)

- 8:40      **Information**
- 9:00      **Sulphate and chromate Aft solid solutions ; characterization and thermodynamic modelling**  
*Sabine Leisinger<sup>1</sup>, B. Lothenbach<sup>2</sup>, R. Kägi<sup>1</sup>, F. Winnefeld<sup>2</sup>, B. Wehrli<sup>1</sup>, C.A. Johnson<sup>1</sup>*  
<sup>1</sup> EAWAG, Dübendorf, Switzerland  
<sup>2</sup> EMPA, Dübendorf, Switzerland
- 9:40      **Improvement of the C-S-H solid solution model using recent spectroscopic and structural information**  
*D. A. Kulik*  
*PSI, Villigen, Switzerland*
- 10:30      **Break**

- 11:00      **Interaction of BaCO<sub>3</sub> in OPC composite cements**  
*C.A. Utton<sup>1</sup>, N.B.Milestone<sup>1</sup>, E. Gallucci<sup>2</sup>*  
<sup>1</sup> University of Sheffield, UK  
<sup>2</sup> EPFL, Lausanne, Switzerland
- 11:25      **Development of pore solution chemistry and hydrate assemblages during hydration of calcium sulfoaluminate cements**  
*F. Winnefeld<sup>1</sup>, B. Lothenbach<sup>1</sup>*  
<sup>1</sup> EMPA, Dübendorf, Switzerland
- 11:50      **Investigation of the hydration of calcium sulfoaluminate cement in the presence of zinc chloride – application to nuclear waste conditioning**  
*S.Berger<sup>1</sup>, J. Berthoumieux<sup>2</sup>, C. Cau dit Coumes<sup>1</sup>, D. Damido<sup>2</sup>, P. Le Bescop<sup>3</sup>*  
<sup>1</sup> CEA Marcoule, France  
<sup>2</sup> Ecole des Mines de Douai, France  
<sup>3</sup> CEA Saclay, France
- 12:15      **Lunch**
- Afternoon session : Topic 1 : Special session on low pH cements**
- Chairpersons*: Hans van der Sloot (ECN)  
                  Erich Wieland (PSI)
- 14:00      **Low pH cements for waste repositories a review**  
*Céline Cau dit Coumes*  
*CEA Valrhô, Marcoule, France*
- 14:40      **Hydration of “low pH” cements**  
*B. Lothenbach<sup>1</sup>, E. Wieland<sup>2</sup>, B. Schwyn<sup>3</sup>, R. Figi<sup>1</sup>, D. Rentsch<sup>1</sup>*  
<sup>1</sup> EMPA, Dübendorf, Switzerland  
<sup>2</sup> PSI, Villigen, Switzerland  
<sup>3</sup> NAGRA, Wettingen, Switzerland
- 15:20      **Break**
- 15:50      **Low pH concrete resistance against underground water aggression**  
*J.L. Garcia Calvo<sup>1</sup>, A. Hidalgo<sup>1</sup>, M.C. Alonso<sup>1</sup>, L. Fernandez Luco<sup>2</sup>*  
<sup>1</sup> CSIC, Madrid, Spain  
<sup>2</sup> IECA, Madrid, Spain

- 16:15 **Modelling of low-pH concrete degradation in a KBS-3 HLNW repository**  
*F. Grandia, J. Salas, J. Molinero, D. Arcos*  
*AMPHOS XXI Consulting, Valldoreix, Spain*
- 16:40 **Break**
- 17:00 **Opening panel discussion :**  
**“Evolution of cement waste systems : pH, metal binding, thermodynamics”**
- C. Cau-dit-Coumes (CEA Marcoule)*  
*E. Gaucher (BRGM)*  
*B. Lothenbach (EMPA)*  
*A. Nonat (ICB/CNRS)*  
*H. van der Sloot (ECN)*  
*Y. Tsuji (Gunma University)*  
*E. Wieland (PSI)*
- 18:00 **End**
- 19:00 **Dinner**

## Tuesday, October 14, 2008

### Morning session : Topic 4 Structure

Chairpersons: B. Lothenbach (EMPA)  
 J. Rose (CEREGE/ CNRS- Université d'Aix-Marseille)

- 9:00 **Structure of cement phases from *ab initio* modelling**  
*S. V. Churakov*  
*PSI, Villigen, Switzerland*
- 9:40 **Durability of a cementitious materials in waste disposal studies : integration of neutron tomography studies with other physical and chemical techniques**  
*P. J. Mc Glinn<sup>1</sup>, D. M. Brew<sup>1</sup>, F. De Beer<sup>2</sup>, M. Radebe<sup>2</sup>, L.P. Alridge<sup>1</sup>, K. P. Olufson<sup>1</sup>, K. E. Prince<sup>1</sup>, I.J. Kelly<sup>1</sup>, T.E. Payne<sup>1</sup>*  
<sup>1</sup> ANSTO, Australia  
<sup>2</sup> NECSA, South Africa
- 10:20 **Break**
- 10:50 **Quantification of pore structure characteristics for deteriorated mortar due to calcium leaching by synchrotron microtomography**  
*T. Sugiyama<sup>1</sup>, M.A.B. Promentilla<sup>1</sup>, T. Hitomi<sup>2</sup>, N. Takeda<sup>2</sup>*  
<sup>1</sup> Hokkaido University, Sapporo, Japan  
<sup>2</sup> Obayashi Corp., Tokyo, Japan
- 11:30 **Micro-spectroscopic investigations of the Al and S speciation in hardened cement paste**  
*E. Wieland<sup>1</sup>, R. Dähn<sup>1</sup>, B. Lothenbach<sup>2</sup>, M. Vespa<sup>3</sup>*  
<sup>1</sup> PSI, Villigen, Switzerland  
<sup>2</sup> EMPA, Dübendorf, Switzerland  
<sup>3</sup> CNRS/University of Grenoble, France
- 12:10 **Lunch**

**Afternoon session : Topic 2 Interfaces**

Chairpersons: Eric Gaucher (BRGM)  
Yukikazu Tsuji (Gunma University)

- 14:00 **Modelling of concrete/clay interaction : influence of non – saturated conditions**  
*F. Claret<sup>1</sup>, A. Burnol<sup>1</sup>, A. Dauzières<sup>2</sup>, P. Le Bescop<sup>2</sup>, S. Dewonck<sup>3</sup>, Y. Linard<sup>3</sup>, X. Bourbon<sup>4</sup>, E.C. Gaucher<sup>1</sup>*  
<sup>1</sup> BRGM, Orléans, France  
<sup>2</sup> CEA Saclay, France  
<sup>3</sup> Andra, LSBHM, Bure, France  
<sup>4</sup> Andra, Châtenay-Malabry, France
- 14:40 **Physico-chemical investigation of clayed rock/cement based-materials interaction in the context of geological waste disposal : experimental approach and preliminary results**  
*A. Dauzières, P. Le Bescop*  
CEA, Saclay, France
- 15:05 **Diffusion of an alkaline and hyperalkaline solution through compacted Mg-saturated bentonite**  
*R. Fernandez<sup>1</sup>, U. Mäder<sup>1</sup>, J. Cuervas<sup>2</sup>*  
<sup>1</sup> University of Bern, Switzerland  
<sup>2</sup> University of Madrid, Spain
- 15:30 **Break**
- 15:50 **Evaluation of long-term durability of engineered barrier system of bentonite and cementitious materials by migration technique**  
*K. Nakarai<sup>1</sup>, M. Watanabe<sup>1</sup>, T. Sugiyama<sup>2</sup>, Y. Tsuji<sup>1</sup>*  
<sup>1</sup> Gunma University, Japan  
<sup>2</sup> Hokkaido University, Japan
- 16:15 **Geochemical evolution of concrete during long-term interaction with soil water in a near-surface radioactive waste disposal facility**  
*D. Jacques, L. Wang, E. Martens, D. Mallants*  
BNRC, Boeretang, Belgium

- 16:40 **Modelling of chemical alteration of cement materials in radioactive waste repository environment**  
*D. Sugiyama<sup>1</sup>, I. Kurashige<sup>2</sup>*  
<sup>1</sup> NTRL, CRIEPI, Tokyo, Japan  
<sup>2</sup> CERL, CRIEPI, Tokyo, Japan
- 17:05 **A method of section design of chemically pre-stressed concrete members using a concept of work-done by expansive concrete**  
*K. Suhara<sup>1</sup>, A. Hor<sup>2</sup>, M. Ashida<sup>1</sup>, Y. Tsuji<sup>3</sup>*  
<sup>1</sup> Denki Kagaku Kogyo, Japan  
<sup>2</sup> Denka Chemicals GmbH, Düsseldorf, Germany  
<sup>3</sup> GUNMA University, Gunma, Japan
- 17:30 **Break**
- 19:00 **Poster session/Buffer**

Wednesday, October 15, 2008

**Morning session : Topic 3 Interaction with trace elements**

Chairpersons: A. Johnson (EAWAG)  
C. Landesman (Subatech)

- 8:30 **Speciation and role of iron phases in cement to fix heavy metals**  
J. Rose<sup>1,2</sup>, A. Benard<sup>2,3</sup>, A. Masion<sup>1,2</sup>, P. Chaurand<sup>1,2</sup>, I. Moulin<sup>4</sup>, J.-Y. Bottero<sup>1,2</sup>  
<sup>1</sup>CEREGE, CNRS-Université Paul Cézanne, Aix en Provence, France  
<sup>2</sup>ARDEVIE, Aix en Provence, France  
<sup>3</sup>INERIS, Aix en Provence, France  
<sup>4</sup>LERM, Paris, France
- 9:10 **Interactions of actinides with cement corrosion products in chloride rich solution : modelling and experimental results**  
V. Metz, B. Kienzler, A. Bauer, E. Bohnert, M. Schlieker  
*INE, Karlsruhe, Germany*
- 9:50 **Leaching mechanisms of antimonate<sup>+</sup> in cementitious systems**  
G. Cornelis, T. Van Gerven, C. Vandecasteele  
*KU Leuven, Leuven, Belgium*
- 10:15 **Break**
- 10:45 **Uranium(VI) uptake by calcium silicate hydrates**  
J. Tits<sup>1</sup>, N. Macé<sup>1</sup>, G. Geipel<sup>2</sup>, M. Eilzer<sup>2</sup>, E. Wieland<sup>1</sup>  
<sup>1</sup>PSI, Villigen, Switzerland  
<sup>2</sup>FDR, Dresden, Germany
- 11:10 **Modelling lead leaching from cementitious waste forms using PHREEQC**  
E. Martens<sup>1</sup>, D. Jacques<sup>1</sup>, T. Van Gerven<sup>2</sup>, L. Wang<sup>1</sup>, D. Mallants<sup>1</sup>  
<sup>1</sup>SCK-CEN, Mole, Belgium  
<sup>2</sup>KU Leuven, Leuven, Belgium
- 11:35 **Adsorption of multivalent ions in cementitious materials : Importance of electrostatics**  
C. Labbez, M. Medala, I. Pochard, A. Nonat  
*ICB, CNRS-University de Bourgogne, Dijon, France*

12:00 **Lunch**

**Afternoon session : Topic 2 Waste and cementitious systems**

Chairpersons: Xavier Bourbon (Andra)  
Céline Cau dit Coumes (CEA)

- 13:30 **European standardisation and regulatory developments in relation to release from monolithic materials – stabilised waste and cement-based construction products – to soil groundwater – an update.**  
H.A. van der Sloot<sup>1</sup>, J.C.L. Meeussen<sup>1</sup>, O. Hjelm<sup>2</sup>, G. Spanka<sup>3</sup>  
<sup>1</sup>ECN, Petten, The Netherlands  
<sup>2</sup>DHI, Horshoim, Denmark  
<sup>3</sup>VDZ, Düsseldorf, Germany
- 13:55 **Influence of high nitrate salts concentrations on dimensional variation of mortars under wet-curing**  
P. Bénard<sup>1</sup>, C. Cau-dit-Coumes<sup>2</sup>, S. Garrault<sup>1</sup>, A. Nonat<sup>1</sup>  
<sup>1</sup>I.C.B, CNRS-Université de Bourgogne, Dijon, France  
<sup>2</sup>CEA Valrhô, Marcoule, France
- 14:20 **Experimental and modelling study of salt binding and release by stabilized MSWI fly ash wastes**  
L. De Windt<sup>1</sup>, R. Bleijerveld<sup>2</sup>, S. Brault<sup>3</sup>, N. Humez<sup>4</sup>, A. Keulen<sup>2</sup>, M.C. Magnié<sup>3</sup>, P. Ruat<sup>5</sup>, H.A.E. Simons<sup>6</sup>, J. van der Lee<sup>1</sup>  
<sup>1</sup>ENSMP, France ; <sup>2</sup>A&G Maasvlakte, Netherlands  
<sup>3</sup>INERTEC, France ; <sup>4</sup>SARP Industries, France  
<sup>5</sup>Séché Industries, France ; <sup>6</sup>LBP, Netherlands
- 14:45 **Modelling release of inorganic substances from cement stabilized waste and cement mortars**  
J.C.L. Meeussen, H.A. van der Sloot  
*ECN, Petten, The Netherlands*
- 15:10 **Feasibility studies for the treatment and reuse of contaminated marine sediments**  
L. Bonomo<sup>1</sup>, A. Careghini<sup>1</sup>, S. Dastolf<sup>2</sup>, L. De Propris<sup>2</sup>, G. Ferrari<sup>3</sup>, M. Gabellini<sup>2</sup>, S. Saponaro<sup>1</sup>  
<sup>1</sup>Politecnico of Milan, Milan, Italy  
<sup>2</sup>ICRAM, Rome, Italy  
<sup>3</sup>MAPEI, Milan, Italy

15:35      **Break**

16:00      **Social event : Visit of the “Océarium” at Le Croisic**

20:00      **Conference Dinner**

## Thursday, October 16, 2008

### Morning session : Topic 5 Leaching, Transport

*Chairpersons:* Bernd Grambow (Subatech)  
Neil Milestone (University of Sheffield, UK)

8:30      **Analytical modelling of the coupling between microstructure and effective diffusivity of concrete**  
*W. Dridi, N. Meddahi*  
CEA Saclay, France

9:10      **Cracks and pores – their roles in the transmission of water through degrading concrete barriers**  
*L.P. Alridge<sup>1,3</sup>, H.N. Bordallo<sup>2</sup>, K. Fernando<sup>1</sup>*  
<sup>1</sup> ANSTO, Australia  
<sup>2</sup> Hahn-Meitner Institut, Berlin, Germany  
<sup>3</sup> University of New South Wales

9:35      **Cement-based materials in contact with water – reactive transport driven by surface processes**  
*M. Schwortzer<sup>1</sup>, T. Scherer<sup>2</sup>, A. Gerdes<sup>1,3</sup>*  
<sup>1</sup> ITC-WGT, FZK, Karlsruhe, Germany  
<sup>2</sup> INT, FZK, Karlsruhe, Germany

10:00      **Break**

10:30      **Comparative study using some advanced simulation methods for leaching of cementitious materials over thousands of years**  
*T. Torichigai<sup>1</sup>, K. Yokozeki<sup>2</sup>, T. Ishida<sup>2</sup>, K. Nakarai<sup>3</sup>, D. Sugiyama<sup>4</sup>*  
<sup>1</sup> Kajima Technical Research Institut, Japan  
<sup>2</sup> University of Tokyo, Tokyo, Japan  
<sup>3</sup> Gunma University, Japan  
<sup>4</sup> CRIEPI, Japan

10:55      **Experimental and modelling approach of cement paste leaching at high temperature and pressure**  
*N. Neuville<sup>1,2</sup>, G. Aouad<sup>1</sup>, E. Lécolier<sup>2</sup>, A. Rivereau<sup>2</sup>, D. Damidot<sup>1</sup>*  
<sup>1</sup> ENSMD, DOUAI, France  
<sup>2</sup> IFP, Rueil-Malmaison, France

11:20      **Final conclusions**

11:50      **Lunch**