NUWCEM 2022 – Detailed program

4th International Symposium on Cement-Based Materials for Nuclear Wastes

May 4 to 6, 2022
Avignon, France

WEDNESDAY 04

- 8:00 Congress Center Opening
- 9:00 Welcome Address
- 9:15 Keynote 1
- 9:45 Technical Session 1.1
- 11:00 Break
- 11:30 Technical Session 1.2
- 12:00 Posters: Flash presentations
- 12:30 Lunch
- 2:00 Technical sessions 2.1, 2.2, 2.3
- 3:30 Posters: Flash presentations
- 4:00 Break
- 4:30 Technical session 2.4
- 6:00 End of day 1

THURSDAY 05

- 8:30 Congress Center Opening
- 9:00 Keynote 2
- 9:30 Technical session 3.1
- 10:15 Posters: Flash presentations
- 10:45 Break
- 11:15 Technical session 3.2
- 12:45 Lunch
- 2:15 Technical session 4.1
- 2:45 Technical session 4.2
- 3:30 Posters: Flash presentations
- 4:00 Break, Poster session 1/2
- 5:00 Technical session 4.3
- 5:45 End of day 2
- 7:00 Symposium reception

FRIDAY 06

- 8:15 Congress Center Opening
- 8:45 Keynote 3
- 9:15 Technical session 5.1
- 11:00 Break
- 11:30 Technical sessions 5.2
- 12:45 Posters: Flash presentations
- 1:00 Lunch, Poster session 2/2
- 2:30 Technical session 5.3
- 3:15 Technical session 5.4
- 3:30 Conclusion

Technical sessions

T01 · Design of cement-waste packages
1.1 · Methodologies to design cement-waste packages
1.2 · Addition of getters

T02 · Understanding cement chemistry
2.1 · Cement hydration process
2.2 · Methods of cement hydration monitoring
2.3 · Mechanisms involved in cement-waste
2.4 · Phases in cementitious systems

T03 · Alternative binders
3.1 · Magnesium phosphate cements
3.2 · Alkali-activated binders

T04 · Problematic wastes
4.1 · Ion exchange resins
4.2 · Metallic waste
4.3 · Organic wastes

T05 · Durability confining properties
5.1 · Retention of radionuclides
5.2 · Leaching
5.3 · Behaviour under irradiation
5.4 · Modelling of long term evolution

	4	5	6		4	5	6
Design of cement waste packages	x			Keynote	x	x	x
Understanding cement chemistry	x			Technical session	x	x	x
Alternative binders		x		Posters session	x	x	x
Problematic wastes		x		Flash presentations	x	x	x
Durability, confining properties			x				

MAY, WEDNESDAY 4

8.00 Registration • "Palais des Papes" Congress Centre Main Entrance

9.00-9.45	Cellier Benoit XII	Welcome & Opening - Keynote 1	
		Welcome address	L.Bordes, Deputy Director of ISEC, CEA (France)
		> Chairs: L. STEFAN (ORANO) & D. CHARTIER (CEA)	
		Opening speeches - Keynote 1 Development of alternative cements for the treatment of intermediate level waste at Sellafield Site	M. HAYES, National Nuclear Laboratory (United Kingdom)

9.45-11.00 | Cellier Benoit XII | Design of cement waste packages

IAEA's perspective on the status of cement-based conditioning in the processing radioactive waste	W. MEYER, IAEA (Austria)
Cementing a Radioactive Barium Sulphate Precipitate	A. WAELLISCH, Paul Scherrer Institute (Switzerland)
On the transferability of research on surrogate material towards the real radioactive waste	E. COPPENS, ONDRAF/NIRAS (Belgium)
Thermal analysis of a large industrial container (2.7 m3) filled up with geopolymer mortar	P. GIRARDIN, CEA (France)
Delayed ettringite formation thermal management in cement grout for the conditioning of long-lived medium-level radioactive waste	I. RUPP, EDF (France)

11.00-11.30 | Paneterie |

> Chairs: A. WAELLISCH (PSI) & N. COURTOIS (CEA)

11.30-12.00 | Cellier Benoit XII

Evaluation of the diffusion coefficient with tritiated water by a comparative method in durable and confining concrete as defined by ANDRA	A. ROOSES, ORANO (France) & J. MULLER, ANDRA (France)
Multiphase (oil/water/sludge) radioactive liquid waste solidification with polymer and cement – Sogin Experience	F. PANCOTTI, SOGIN (Italy)

12.00-12.30 | Cellier Benoit XII | Flash presentations

From theory to practice – demonstration of the transferability of early age properties between a simulated and a real life ILLW in a cementitious matrix	G. VANLOMMEL, BELGOPROCESS (Belgium)
Formulation development and process qualification activities for direct cementation of small volume of alpha contaminated aqueous waste	F. PANCOTTI, SOGIN (Italy)
Strategy to immobilize acidic high-level liquid waste in a blended cement	E. FERREIRA, SCK (Belgium)
Development of a cementation process for the conditioning of legacy waste (HAO project)	A.-L DE PERTHUIS, ORANO (France)
Development of a cementation process for the conditioning of legacy waste (DFG project)	J. MARGUERIE, ORANO (France)
Reuse of hardened Portland cement as a part of cement matrix for nuclear waste encapsulation	H. KINOSHITA, University of Sheffield (United Kingdom)
Production of geometry-standardized concrete containers with customized inner parts for the conditioning of radioactive waste	A. LECONTE, ORANO (France)

12.30-14.00 | Paneterie | Lunch

> Chairs: B. LOTHENBACH (EMPA) & C. CAU DIT COUMES (CEA)

14.00-15.30 | Cellier Benoit XII | Understanding cement chemistry

Early-age hydration of anhydrous calcium aluminate phases in suspension	J.B CHAMPENOIS, CEA (France)
Effects of phosphates on calcium aluminate cement under hydrothermal conditions	H. KINOSHITA, University of Sheffield (United Kingdom)
Investigation of the physico-chemical properties of cements by electrochemical impedance spectroscopy	S. DELPECH, IJCLab (France)
Exploiting X-ray CT to understand the behavior a new clinker substitute for cement	A. KOZLOWSKI, University of Strathclyde (United Kingdom)
Study of alkali-silica reaction occurring in cemented waste packages based on simplified model and concrete medium approaches	N. COURTOIS, CEA (France)
Solubility and sorption of Be(II) in cement systems	X. GAONA, Karlsruhe Institute of Technology (Germany)

15.30-16.00 | Cellier Benoit XII | Flash presentations

The Pit 0 geopolymer manufacturing unit: from the R&D to the industrial scale	J. DORIGUZZI, CEA (France)
Activation of slag blended cement with diethanol-isopropanolamine	R. REIVER, IMT Mines Alès (France)
Development of calcium sulfoaluminate cements for the encapsulation of intermediate level waste	G.M. CANN, NNL (United Kingdom)
Effect of Sr on geopolymer wasteform reaction kinetics, mechanisms and nanostructure	D. GEDDES, University of Sheffield (United Kingdom)
Development of the use of geopolymer cements for the treatment of intermediate level radioactive waste	S. COCKBURN, NNL (United Kingdom)
Containment of radioactively-contaminated soil: from differences in matrix composition to the performance of a remediation technique	H. RAVEH-AMIT, Nuclear Research Center Negev (Israel)
Encapsulation of iodine-loaded ion exchangers in alkali-activated cement wasteforms	K. O'DONOGHUE, University of Sheffield (United Kingdom)

16.00-16.30 | Paneterie |

> Chairs: G. LE SAOUT (IMT Mines Alès) & J.B. CHAMPENOIS (CEA)

16.30-18.00 | Cellier Benoit XII

Understanding cement chemistry

Molecular dynamic simulations of Be(II) adsorption on C-S-H phases	I. ANDRONIUK, Karlsruhe Institute of Technology (Germany)
Interaction of CsCl and CsI aqueous solutions with ettringite probed by atomistic computer simulations	A.G. KALINICHEV, SUBATECH (France)
Effect of alkali hydroxide on calcium silicate hydrate (C-S-H)	Y. YAN, EMPA (Switzerland)
A CASH+ solid solution for modeling cation uptake in cementitious materials used in waste management	G.D MIRON, Paul Scherrer Institut (Switzerland)
Development of thermodynamic data for Mg-Al layered double hydroxide containing carbonate, sulfate, chloride and nitrate	E. BERNARD, University of Bern & EMPA (Switzerland)
Structural incorporation pathways of FeII into zeolite frameworks in cement-relevant environments	B. MA, EMPA (Switzerland)

18.00 End of day 1

MAY, THURSDAY 5

8.30 Registration • "Palais des Papes" Congress Center Main Entrance

> Chairs: W. MEYER (IAEA) & H. KINOSHITA (The University of Sheffield)

9.00-09.30 | Cellier Benoit XII

Keynote 2

Effect of Ca, alkali, aluminum and temperature on alkali silica reaction	B. LOTHENBACH, EMPA (Switzerland)

9.30-10.15 | Cellier Benoit XII

Alternative binders

Towards the optimization of magnesium phosphate cements formulations for reactive metals encapsulation	R. FERNANDEZ, Autonomous University of Madrid (Spain)
Leaching behavior of magnesium phosphate cement pastes	L. DIAZ CASELLES, CEA (France)
Design and characterization of cement-based materials for dihydrogen trapping	C. CAU DIT COUMES, CEA (France)

10.15-10.45 | Cellier Benoit XII

Flash presentations

Hydrogen sequestration in MnO2/Ag2O-functionalized alkali-activated materials immobilizing radioactive oil	C. REEB, CEA (France)
Optimize cementation of spent ion exchange resins by resin liquefaction	R. LEHR, FRAMATOME GmbH (Germany)
Compatibility of stainless steel 316L with geopolymer-based waste immobilization matrices	M. ARBEL-HADDAD, Nuclear Research Center Negev (Israel)
Trapping efficiency of a Portland-based mortar incorporating a tritium getter for radioactive waste conditioning	C.A. DAVY, Centrale Lille (France)
Innovative and green pre-impregnation solution for the disposal of radioactive liquid organic waste	I. MOSCHETTI, Politecnico di Milano (Italy)
Aluminosilicate nanomaterials for the encapsulation of organic waste in a cementitious matrix	E. PUEL, CEA (France)
Solidification of liquid scintillation waste	A. BARANYI, MVM Paks NPP (Hungary)

10.45-11.15 | Paneterie |

> Chairs: G. BAR NES (NRCN) & D. LAMBERTIN (CEA)

11.15-12.45 | Cellier Benoit XII

Alternative binders

Safe and efficient cementation of challenging radioactive wastes using alkali-activated materials	D. GEDDES, University of Sheffield (United Kingdom)
Cs immobilization in composite crystalline-amorphous geopolymers elucidated by 133Cs solid state NMR	M. ARBEL-HADDAD, Nuclear Research Center Negev (Israel)
Durability of alkali-activated materials in case of groundwater intake	M. DE CAMPOS, CEA (France)
Effect of accelerated carbonation on microstructure and mineralogy of metakaolin-based geopolymer with high water-to-binder ratios	T.N. NGUYEN, SCK CEN (Belgium)
Alkali-activated concrete: investigation on resistance to chloride-induced corrosion	N. GHAFOORI, University of Nevada (USA)
EURAD MAGIC project - Chemo-Mechanical AGIng of Cementitious materials under coupled disturbances based on a multi-scale approach	A. DAUZERES, IRSN (France)

12.45-14.15 | Paneterie | Lunch

14.15-15.30 | Cellier Benoit XII

Problematic wastes

> Chairs: E. COPPENS (ONDRAF) & S. PERRIN (CEA)

Promising pre-disposal solutions to manage spent radioactive ion exchange resins	F. GALLUCCIO, Politecnico di Milano (Italy)
Immobilization of a thermally-treated ion exchange resins in traditional and geopolymer cementitious systems	M.C. ALONSO, IETcc, CSIC (Spain)
How to manage radioactive beryllium metal wastes?	C. CANNES, IJCLab (France)
Electrochemical impedance spectroscopy: a non-destructive method to study the corrosion of aluminum-magnesium alloys in a magnesium phosphate cement-based matrix	G. PORAS, CEA (France)
Reactivity of steel container in contact with magnesium phosphate cements	K.K. LE, IJCLab (France)

15.30-16.00 Cellier Benoit XII — Flash presentations

Evaluation of assembled organic liquids incorporation on geopolymer matrix: case of viscous oils and greases	M. DE CAMPOS, CEA (France)
Innovative and sustainable tuff-based geopolymers for encapsulation of radioactive solid organic waste	A. SANTI, Politecnico di Milano (Italy)
233U sorption on portlandite and the effect of organic compounds	O. ALMENDROS, CIEMAT (Spain)
Sorption of organics and uranium to CASH	J.D. BEGG, Amphos 21 (Spain)
Sorption of uranium and lead on cement materials	J. KITTNEROVA, Czech Technical University in Prague (Czech Republic)
Degradation products of UP2 filter aid material and their impact on radionuclide retention in cementitious systems Sorption of Eu in presence of EDTA and oxalate on CSH-Phases Interaction of europium with cementitious materials in the presence of organic substances	X. GAONA, Karlsruhe Institute of Technology (Germany) A. THUMM, KIT-INE (Germany) M. BURESOVA, Czech Technical University in Prague (Czech Republic)

16.00-17.00 Paneterie | + Poster sessions

> Chairs: A. ROOSES (ORANO) & A. POULESQUEN (CEA)

17.00-17.45 Cellier Benoit XII — Problematic wastes

The effect of viscosity ratio on the solidification of liquid organic waste using geopolymers	A. HASNAOUI, CEA (France)
3D X Ray micro-tomography as a tool for the formulation of geopolymer-oil emulsions	C.A DAVY, Centrale Lille (France)
A study on mineral oil emulsification in alkali-activated materials	C. REEB, CEA (France)

19.00 Espace Jeanne Laurent | Conference reception

MAY, FRIDAY 6

8.15 Registration • "Palais des papes" Congress Center Main Entrance

> Chairs: X. GAONA (KIT) & G. KOSAKOWSKI (PSI)

08.45-09.15 Cellier Benoit XII — Keynote 3

Consequences of atmospheric carbonation: shrinkage & cracking	S. POYET, CEA (France)

09.15-11.00 Cellier Benoit XII — Durability, confining properties

Research within the CORI WP in EURAD focusing on cement-organics-radionuclide-interactions	N. MACE, CEA (France)
Radionuclide migration studies performed with Task 4 of CORI workpackage	N. MACE, CEA (France)
Radiolysis effects onto europium uptake by cement-based materials containing superplasticizers	S. LEGAND, CEA (France)
Impact of formate, citrate and gluconate on the uptake of radionuclides by cement: study of the binary and ternary systems cement-L and cement-RN-L	R.E. GUIDONE, EMPA & KIT-INE (Switzerland / Germany)
Impact of ISA and chloride on the uptake of Nb(V) by cement	Y. JO, Karlsruhe Institute of Technology (Germany)
Adsorption of short-chain organic molecules and Th onto degraded hardened cement pastes and CSH	D. GARCIA, Amphos21 (Spain)
The effect of organic molecules on the radionuclide behavior in cement-based materials	P. HENOCQ, ANDRA (France)

11.00-11.30 Paneterie |

> Chairs: C. DAVY (ECL) & S. POYET (CEA)

11.30-12.45 Cellier Benoit XII — Durability, confining properties

Short-term impact of simulated bentonite water on the transport properties in high pH FEBEX-plug concrete. Correlation with long-term performance	M.C. ALONSO, IETcc-CSIC (Spain)
Chemo-mechanical characterization of cement pastes placed in magnesian solution	C. DEWITTE, IRSN & INSA Toulouse (France)
Impact of calcareous water on the chemo-mechanical behavior of cement matrices	M. NEJI, IRSN (France)
Sr immobilization in high- and low-pH OPC systems – controlling phases, mechanisms and influence of accelerated carbonation	M.E SHINER, Ben Gurion University of the Negev (Israel)
Fire-resistant geopolymer for an application in geological radioactive waste disposal	S. ROSSIGNOL, IRCER (France)

12.45-13.00 Cellier Benoit XII — Flash presentations

Leaching behaviour of cemented waste with high nitrate content	E. FERREIRA, SCK CEN (Belgium)
Chemical durability of cementitious final waste-forms containing novel radioactive waste of B-10 enriched boric acid: B, Ca, Si, Al, S and Na leachabilities	M. ROSTAMIPARSA, Eötvös Loránd University (Hungary)
Strontium release from wollastonite-based brushite cement under semi-dynamic leaching conditions	J. JDAINI, CEA (France)
Water transfers (imbibition, drying) in cementitious materials followed by MRI (Magnetic Resonance Imaging)	H. DIALLA, CEA (France)

13.00-14.30 Paneterie | Lunch (Buffet) + Poster Session

> Chairs: P. HENOCQ (ANDRA) & F. CHUPIN (CEA)

14.30-15.30 Cellier Benoit XII

Assessment of radiolytic hydrogen gas release from ILW-LL cemented waste	A. ROOSES, ORANO (France)
Effect of sodium nitrate on radiolytic gas production of Portland cement-based materials containing blast furnace slag	D. CHARTIER, CEA (France)
Assessing the impact of chemical processes on the long-term evolution of waste packages by geochemical modelling	G. KOSAKOSWKI, Paul Scherrer Institut (Switzerland)
Chemo-mechanical behavior of CEM I pastes subjected to low-concentration sulfate attack in the context of underground geological disposal	J. POUYA, IRSN & MINES ParisTech (France)

15.30-16.00 Conclusion

16.00 END OF THE CONFERENCE