

11th ICG MONTPELLIER SUMMER SCHOOL

GLASS FORMATION, STRUCTURE, AND PROPERTIES

&

Hazardous Waste Vitrification



8-12th July 2019 - MONTPELLIER, FRANCE

Scientific Program



BASIC SCIENCE

	Monday	Tuesday	Wednesday	Thursday	Friday
08h30	Introduction to the Course/ICG (JP)				
08h45	Optical absorption and redox chemistry. (J. Parker)	Glass ceramics (I): Nucleation and crystallisation (J. Deubener)	Glass ceramics (II): Applications (J. Deubener)	Modelling (I): atomistic simulations (A. Takada)	Questions and Answers
09h45	Thermodynamics of glasses I: One-component and multicomponent glasses (R. Conradt)	NMR in silicate glasses (I) (P. Florian)	NMR in silicates glasses (II) (P. Florian)	Mechanical properties of glass (I) (J.C. Sangleboeuf)	Student presentation of projects
10h45	Coffee break				
11h00	Mass transport in glass. (J. Parker)	Structure (I): Neutron and X-ray diffraction, EXAFS (L. Cormier)	Structure(II): Applications (L. Cormier)	Modelling (I): Bridging macro and micro phenomena (A. Takada)	Student presentation of projects
12h00	Thermodynamics of glasses II: Example: Chemical Durability (R. Conradt)	Vibrations in glasses I: basics of IR & Raman (B. Hehlen)	Vibrations in glasses II: Relation to structure in simples glasses (B. Hehlen)	Mechanical properties of glass (II) (J.C. Sangleboeuf)	Student presentation of projects
13h00	Lunch				
14h30	Students describe their own research activities (5 min /person).	Project allocation & start work on project	Tutorials (see list)	Tutorial (see list)	Visit to Marcoule
15h30			Project workshops	Project workshops	
18h00			(Overview/introduction on HWV) (R. Hand)	TBA (R. Conradt)	
19h00	Welcome reception			School Dinner	

HAZARDOUS WASTE VITRIFICATION

	Monday	Tuesday	Wednesday	Thursday	Friday
08h30	Introduction to the Course/ICG (JP)				
08h45	Optical absorption and redox chemistry. (J. Parker)	Glass ceramics (I): Nucleation and crystallisation (J. Deubener)	International experience of radioactive wastes glass (M. Ojovan)	Glass formulation/redox (O. Pinet)	Questions & Answers
09h45	Thermodynamics of glasses I :One-component and multicomponent glasses (R. Conradt)	NMR in silicate glasses (I) (P. Florian)	Nuclear waste vitrification: focus on French experience (O. Pinet)	Glass property modeling, viscosity, Tg,.. (D. Perret)	Student presentation of projects
10h45	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break
11h00	Mass transport in glass. (J. Parker)	Structure: Neutron and X-ray diffraction, EXAFS (I) (L. Cormier)	Math. Modeling of batch-to-batch conversion during glass melting (R. Pokorny)	Long term behavior (S. Gin)	Student presentation of projects
12h00	Thermodynamics of glasses II: Example Chemical Durability (R. Conradt)	Vibrations in glasses I: basics of IR & Raman (B. Hehlen)	Irradiation damage effects in nuclear glass (S. Peuget)	Chemical durability (R.Hand)	Student presentation of projects
13h00	Lunch	Lunch	Lunch	Lunch	Lunch
14h30	Students describe their own research activities (5 min /person)	Project allocation & Start work on project	Tutorials (see list)	Tutorials (see list)	Visit to Marcoule
15h30			Project workshops	Project workshops	
18h00	(Overview/introduction on HWV) (R. Hand)			TBA (R. Conradt)	
19h00	Welcome Reception			School Dinner	

TUTORIALS

“Under the pine trees”

Glass and phase diagrams - quantitative treatment of multicomponent systems: assessment of glass properties (thermal, mechanical, chemical), approach to structural features & approach to the energetics of glass melting - How to identify the positions of complex glasses in phase diagrams.

Calculating Raman activities : activity of the Raman modes in crystals for a given symmetry and scattering geometry - Molecular selection rules of simple liquids - the case of glasses.

Diffusion coefficient: Values of D , examples. Activation energies. Balance of D vs stress relaxation in ion exchange toughening: Optimum temperature range. Significance of $(Dt)^{1/2}$. Examples of time and distance *e.g.* tin bath depth, chemical toughening, chemical durability effects at room T. Crystal growth, nucleation, coarsening.

Practical aspects on atomistic simulations: how to calculate atomic structures and mechanical, transport and optical properties by simulations.



LIST OF LECTURERS

K. Bange	Owner of the MK Consulting GmbH	Germany	<i>Klaus.bange@live.de</i>
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