12th ICG MONTPELLIER SUMMER SCHOOL

GLASS FORMATION AND PROPERTIES
With a particular emphasis on
Rheology: Viscosity & relaxation

5-9th July 2021 - MONTPELLIER, FRANCE

Scientific Program

	Monday	Tuesday	Wednesday	Thursday	Friday
08h25	Introduction to the Course/ICG (JP)				
08h40	Optical absorption and redox chemistry. (J Parker)	Modelling (I): atomistic simulations. (A Takada)	Modelling (II): Bridging between macroscopic & microscopic phenomena. (A Takada)	Rheology and relaxation (J Deubener)	Q&A Session. Including 'Making Glass' Panel of lecturers
09h40	Thermodynamics of glasses I. One- and multicomponent glasses. (R Conradt)	Structure: Neutron and X-ray diffraction, EXAFS. (R Vacher))	Vibrations (I): IR absorption, Brillouin and Raman Scattering (B Hehlen)	Calorimetry & glass transition (Yuanzheng Yue)	Student presentation of projects
10h40	Comfort break/ Breakout rooms	Comfort break/ Breakout rooms	Comfort break/ Breakout rooms	Comfort break/ Breakout rooms	Comfort break/ Breakout rooms
11h00	Mass transport in glass. (J Parker)	Glass ceramics (I): Nucleation and crystallization. (J Deubener)	Vibrations (II): relation with glass structure (B Hehlen)	Measuring and modelling glass viscosity I (M Ojovan)	Student presentation of projects
12h00	Thermodynamics of glasses II: Example: chemical durability . (R Conradt)	NMR in silicates glasses. (P Florian)	Mechanical properties of glass. (R Hand)	Glass melt viscosity & Industry (R Conradt)	Questionnaires and awards
13h00	Lunch break	Lunch break	Lunch break	Lunch break	
14h15	Students describe their own research activities. (4 min /person – no more than 5 slides).	NMR in silicate glasses 2. (P Florian)	Tutorials	Tutorial	
		Project allocation & start work on project	Project workshops	Project workshops	
	Welcome reception. Breakout rooms			Tourist Office and Breakout rooms	

TUTORIALS (choose a maximum of 2 from 5)

"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. Effect of temperature. D *vs* stress relaxation in ion exchange toughening: Significance of $(Dt)^{1/2}$. Examples of time and distance *e.g.* tin bath depth.

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

Mechanical Properties: how to carry out measurements and obtain meaningful data

LIST OF LECTURERS

R. Conradt	UniglassAC GmbH Co.	Aachen, Germany	*reinhard.conradt@gmail.com*
J. Deubener	Technishe Universität Clausthal	Clausthal-Zellerfeld, Germany	*jd@tu-clausthal.de*
P. Florian	CEMHTI-CNRS	Orleans France	*Pierre.florian@cnrs-orleans.fr*
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ICG International Commission on Glass

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