14th ICG SUMMER SCHOOL

GLASS FORMATION, STRUCTURE, AND PROPERTIES

2nd – 7th July 2023 – Montpellier France

Scientific Program

BASIC SCIENCE

	Monday	Tuesday	Wednesday	Thursday	Friday
08h30	Welcome. Introduction to the Course and ICG (**J. Parker**)				
08h45	Optical absorption and redox chemistry (**J. Parker**)	Structure (I): Neutron and X-ray diffraction (**R. Vacher**)	Mechanical properties of glass (I) **R. Hand**	Modelling (I): atomistic simulations (**A. Takada**)	Debates
09h45	Thermodynamics I: One-component and multicomponent oxide glasses (**R. Conradt**)	NMR in oxide glasses (I) (**P. Florian**)	Glass ceramics (I): (**J. Deubener**)	Vibrations (I): basics of IR absorption, Brillouin and Raman scattering **(B. Hehlen**)	Debates
10h45	**Coffee break**	**Coffee break**	**Coffee break**	**Coffee break**	10h45 **Coffee break**
11h00	Mass transport in glass. (**J. Parker**)	Structure (II): Neutron and X-ray diffraction: applications (**R.Vacher**)	Mechanical properties of glass (II) **R. Hand**	Modelling (II): Bridging between macroscopic and microscopic phenomena (**A. Takada**)	Debates
12h00	Thermodynamics II: Combustion processes (**R. Conradt**)	NMR in oxide glasses (II) (**P. Florian**)	Glass ceramics (II): (**J. Deubener**)	Vibrations (II): relation with glass structure (**B. Hehlen**)	12h **Closing Event**
13h00	**Lunch**	**Lunch**	**Lunch**	**Lunch**	
14h30	Students describe their own research activities (5 min /person).	Project allocation & initial preparation	Tutorials (Select from list)	Tutorial (Select from list)	
15h30			Workshops Project preparation	Workshops Project preparation	
18h00	To be announced (**E. Muijsenberg**)			Chemical durability (**R. Conradt**)	
19h00	**Welcome reception**			**School Dinner**	

TUTORIALS

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: 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.

Strength: subject to demand

LIST OF LECTURERS

R. Conradt	Aachen University & 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*
R. Hand	University of Sheffield	Sheffield, UK	*r.hand@sheffield.ac.uk*
B. Hehlen	University of Montpellier	Montpellier, France	*bernard.hehlen@umontpellier.fr*
E. Muijsenberg	Glass Services	Vsetin, Czech Republic	*erik.muijsenberg@gsl.cz*
J. Parker	University of Sheffield	Sheffield, UK	*j.m.parker@sheffield.ac.uk*
A. Takada	University College London (ex-AGC)	Tokyo, Japan	*akira_takada_scientist@yahoo.co.jp*
R. Vacher	University of Montpellier -CNRS,	Montpellier, France	*rené.vacher@umontpellier.fr*

ICG International Commission on Glass


ICG
International Commission on Glass


LABORATOIRE
CHARLES COULOMB
MONTPELLIER