



# 2<sup>nd</sup> ICG-CGCRI Tutorial 2021 Through On-line Mode

Website: [www.icg-cgcri-tutorial2021.com](http://www.icg-cgcri-tutorial2021.com)

**18-23 and 25-27 January 2021 (09 days)**

Hosted by:



**CSIR-CENTRAL GLASS & CERAMIC RESEARCH INSTITUTE**

196 Raja S. C. Mullick Road, Kolkata – 700032, India

## Preamble

The International Commission on Glass (ICG) and CSIR-Central Glass & Ceramic Research Institute [CSIR-CGCRI], Kolkata, India are jointly organizing the 2nd ICG-CGCRI Tutorial 2021 in online mode through MS Team during January 18 – 27, 2021. The tutorial will cover various aspects of glass science and technology including basics of glass/glass-ceramics and glass melts, structural aspects of glass, advanced characterization techniques, properties of glass, glasses and glass-ceramics for advanced applications. For the benefit of the budding glass researches across the globe, ICG hosts its winter and summer schools every alternative year in Wuhan, China and Montreal, France. Keeping in mind Indian glass community, especially young glass researchers, CGCRI, Kolkata organized such ICG-CGCRI Tutorial event first in 2017 which received an overwhelming appreciation. This Tutorial is supported by the ICG education team consisting of entire galaxy of stalwart faculties from across the globe who not only designed the course curriculum, but will also teach, inspire and mentor the students during their entire course work. It is envisaged that the tutorial will help in enrichment of knowledgebase, promote networking and significantly contribute in development of skilled human resource in the field of Glass Science and Technology.

This would be a unique opportunity for the students, young researchers, young faculties and glass industry representatives. We planned to select up to 60 students for this school from across the globe based on their area of research and achievements in the glass research. So, hurry up the Future Glass Scientists and register before deadline to get enriched, inspired and mentored by the highly experienced teaching faculties.

## Background

### ICG-CGCRI Tutorial 2021 in Kolkata, India

International Commission on Glass (ICG) is a non-profit international Society of national scientific and technical organizations with particular interests in glass science and technology. The aim of ICG is to promote and stimulate understanding and cooperation between glass experts in the fields of science and technology as well as art, history and education. ICG has been providing valuable networking and collaborative efforts since the late 1980s. For the benefit of the budding glass researches across the globe, ICG host its winter and summer schools every alternative years in Wuhan, China and Montreal, France covering the aspects of glass since from basics to the advanced applications in view of academia as well as industry. Similar to that for the benefit of Indian glass researchers, in 2017 ICG-CGCRI Tutorial was hosted in India by CGCRI, Kolkata. This was attended by 31 students, young researchers



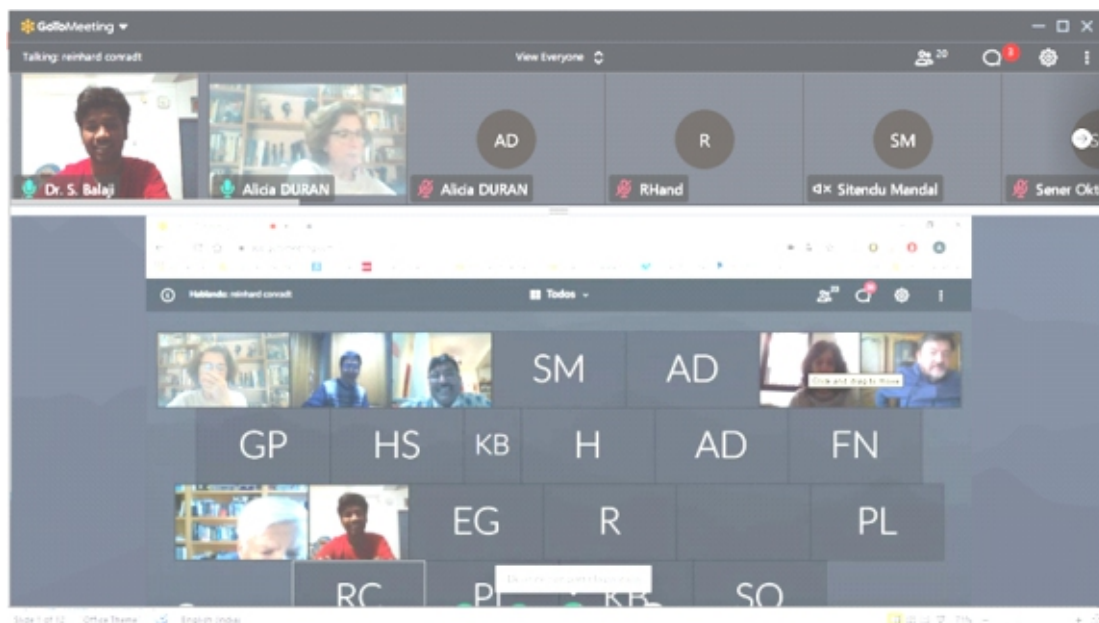
and academics from 11 different institutions within India. It was overwhelmingly supported by ICG's core group of international faculties from USA, UK, Japan, Brazil, Germany and Spain. The teaching programme was also supplemented by glass experts from India. A high level of appreciation was received from the students which are reflected through their generous feedback. The participants expressed the need of organizing such Tutorial in association with ICG on regular basis to disseminate knowledge on basics of glass research. As there is a growing research interest in the field of glass, such tutorial is anticipated to contribute towards the development of highly skilled human resources which could be useful for global glass platform.

CSIR-CGCRI is the largest premier research institute dedicated for Glass & Ceramics research and education in the country. In view of the above, CGCRI has decided to host such event in regular basis i.e., once in every four years. The proposal to host ICG-CGCRI Tutorial was presented by CGCRI representatives during the 25th International Congress on Glass (ICG-2019) organized and hosted by The American Ceramic Society (ACerS) at Boston, Mass., USA during June 9-14, 2019. President, ICG advised to submit the formal proposal through ICG Technical committee on education (TC-23) chaired by Prof. Ana Candida Martins Rodrigues, Professor, Vitreous Materials Laboratory, Department of Materials Engineering, Federal University of São Carlos, São Paulo, Brazil. A meeting was organized with Prof. Rodrigues during her visit to CGCRI, Kolkata India on 16th January 2020. Prof. Rodrigues welcomed the ICG-CGCRI Tutorial proposal to be hosted by CSIR-CGCRI, in India once in every four years and in principle approved. It has been decided that CGCRI will formally submit the proposal to the ICG for their consideration.



*25th International Congress on Glass (ICG-2019), Boston, USA*

Accordingly, the proposal has been submitted to the President, ICG and it has been considered for presentation in the Spring Steering Committee Meeting of ICG supposed to be held in Mainz, Germany from 4th -6th March, 2020. Due to the pandemic situation raised by COVID-19 across the globe, the meeting was cancelled and the same was arranged through an web based Meeting by ICG on 25th March 2020.



*ICG- SCM through Web on 25-03-2020*

The meeting was attended by the CGCRI representatives and presented the proposal which was accepted by the members of ICG anonymously. The decision of the Steering committee of the ICG regarding approval of ICG-CGCRI tutorial in January 2021 in Kolkata was communicated to CGCRI through an email, dated 26 March 2020. Accordingly, the 2<sup>nd</sup> ICG-CGCRI Tutorial has been proposed to host tentatively during 18th to 27th January 2021 in CSIR-CGCRI, Kolkata, India. It is expected around 60 students and industry representatives across India and around 12 ICG members and 15 faculties across the globe are going to take part in the 2<sup>nd</sup> ICG-CGCRI Tutorial.



**Organizing Committee**  
**2<sup>nd</sup> ICG-CGCRI Tutorial 2021**  
(Through On-line Mode)  
18-23 and 25-28 January 2021 (10 days)

To be organized by  
**CSIR – Central Glass and Ceramic Research Institute**  
Kolkata, India

Director, CSIR-CGCRI	<b>Chairman</b>
Shri Sitendu Mandal, Mentor, Specialty Glass Division (SGD)	<b>Organizing Secretary</b>
<b>Tutorial Core Secretariat</b> Dr. Atiar Rahaman Molla, Principal Scientist, SGD: Organizing Joint Secretary(I)(Technical and Secretariat) Dr. Kaushik Biswas, Principal Scientist, SGD: Organizing Joint Secretary (II) (Technical and Secretariat)	
Dr. K. Annapurna, Sr. Principal Scientist, SGD In-charge, Virtual Mode Arrangement and Students' Projects  Assisting Members:  Dr. Anal Tarafder, Pr. Scientist Dr. Sourja Ghosh, Pr. Scientist, WTD Dr. Debashri Ghosh, Sr. Scientist, FOPD Dr. Shirshendu Chakraborty, Sr. Scientist, SGD Mr. Srikrishna Manna, Sr.Tech.Officer (2),SGD Mr. Agniv Adhikary, Sr.Tech.Officer (1), ITD Ms Ruma Chakraborty, Sr.Tech.Officer(1), TCC	Shri Santanu Sen, Sr. Principal Scientist and Head, Instrumentation Section, MCID: In-charge, Instrumentation Facilities and General Arrangement  Assisting Members:  Shri M L Ram, Sr.Tech.Officer (3), SGD Shri Mrinmoy Adhikary, Tech. Officer, SGD Shri Shibasish Barik, Tech. Officer, SGD Shri Gautam Ghosh, Sr. Technician (2), MCID

Dr. Sunirmal Jana, Sr. Principal Scientist, SGD: In-charge, Finance Management and Day to Day Event Management

Assisting Members:

Mrs. Mousumi Majumdar, Sr. Principal Scientist, MCID, Dr. P. K. Sinha, Sr. Principal Scientist, AMCCD, Mr. Rana Dasgupta, Principal Technical Officer, SGD, Mr. Priyam Mukherjee, S.O (F & A), Ms. Subarna Roy, ASO (G), Finance and Accounts

Dr. Debashis Bandyopadhyay, Sr. Principal Scientist and Head, ISTAG: In-charge, Liaison with CSIR and Electronic Media

Assisting Members:

Dr. N. C. Pramanik, Sr, Principal Scientist, SGD  
Dr. Indranil Biswas, Pr. Scientist, PPBDD  
Dr. Ambarish Sanyal, Sr. Scientist, FMDD  
Mr. Debshis Sarkar, Sr. Technical Officer (2), PPBDD  
Mrs. Krishna Bhattacharya, Sr. Hindi Officer, Hindi Cell

Dr. Ashis K. Mandal, Principal Scientist, SGD  
In-charge, Tutorial Registration and Logistics

Assisting Members:

Dr. Sumana Ghosh, Pr. Scientist, BCCD  
Dr. Anirban Dhar, Sr. Scientist, FOPD  
Dr. Himanshu S. Maharana, Scientist, SGD  
Mr. Sanjib Samaddar, Sr. Tech. Officer (2), SGD








Dr. Sunirmal Jana, Sr. Principal Scientist, SGD  
In-charge, Tutorial Website  
Designing and E-Brochure Committee

Assisting Members:

Mr. Agniv Adhikary, Sr. Tech. Officer (1), ITD  
Dr. S. Balaji, Pr. Scientist, ACCD  
Dr. Kausik Dana, Pr. Scientist, RTCD  
Dr. Atasi Pal, Pr. Scientist, FOPD  
Dr. Ambarish Sanyal, Sr. Scientist, FMDD  
Dr. Srabane Sen, Pr. Scientist, FMDD  
Mr. Sukamal Mondal, Pr. Tech. Officer, KIMD  
Mr. Sirshendu Ghorui, Sr. Tech. Officer (1), SGD  
Mrs. Sanhita Ganguly, S.O (G), Establishment

Dr. Ranjan Sen, Chief Scientist (Rtd.) and Former Head, GD & FOPD CGCRI:  
Advisor, Tutorial Organizing Committee

## List of Faculty Members

NAME	TOPIC
 <b>Prof. R. Conradt</b> Germany	<ul style="list-style-type: none"><li>➤ Phase equilibria and chemical activities in glass melts</li><li>➤ Thermodynamics and energy demands for batch to melt conversion</li><li>➤ Chemical Durability of Glass</li></ul>
 <b>Prof. J. M. Parker</b> UK	<ul style="list-style-type: none"><li>➤ Optical Properties of Glass; Glass color and redox chemistry (I)</li><li>➤ Optical Properties of Glass; Glass color and redox chemistry (II)</li></ul>
 <b>Prof. Alicia Duran</b> Spain	<ul style="list-style-type: none"><li>➤ Evolution of theories on glass structure</li></ul>
 <b>Prof. M. K. Choudhary</b> USA	<ul style="list-style-type: none"><li>➤ Heat Transfer Phenomena in Glass Melting Processes</li></ul>
 <b>Prof. Ana C. M Rodrigues</b> Brazil	<ul style="list-style-type: none"><li>➤ Ionic conductivity in Glasses</li></ul>
 <b>Prof. P. Florian</b> France	<ul style="list-style-type: none"><li>➤ NMR technique for evaluation of glass structure (I)</li><li>➤ NMR technique for evaluation of glass structure (II)</li></ul>
 <b>Prof. B. Hehlen</b> France	<ul style="list-style-type: none"><li>➤ Vibrations (I): basics of IR absorption, Brillouin and Raman scattering</li><li>➤ Vibrations (II): relation with glass structure &amp; properties</li></ul>



**Prof. A. Varshneya**  
USA

- Mechanical properties of glass
- Glass Strengthening Techniques



**Prof. John Mauro**  
USA

- Futuristic glasses



**Prof. Akira Takada**  
Japan

- Modelling (I): Atomistic simulations
- Modelling (II): Relation with structure and properties



**Prof. E. D. Zanotto**  
Brazil

- Glass-Ceramics (I): Fundamentals of Nucleation and Crystallization
- Glass-Ceramics (II): Advanced Applications



**Prof. S. Tanabe**  
Japan

- Rare-earth doped glasses for photonic applications



**Prof. A. R. Boccaccini**  
Germany

- Bioactive glass and glass-ceramic



**Prof. R. J. Hand**  
UK

- Nuclear waste vitrification and chemical durability



**Prof. R. Vacher**  
France

- Neutron and X-ray diffraction studies of glass



# Course Curriculum

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CSIR-CENTRAL GLASS & CERAMIC RESEARCH INSTITUTE  
196 Raja S. C. Mullick Road, Kolkata – 700032, India

## **Break down of each 60 Minutes Lecture Session**

**Introduction to the speaker: 5 min**

**Tutorial Lectures (Interactive Session): 45 min**

**Question and Answer: 10 min**

**Platform to be used: MS Teams**

Day 1 18th January 2021 (Monday)

	Instructor	Country and Affiliation	Date and Time (IST) Tentative
<p><b>Inaugural Program</b> Introductory Remarks: Dr. Dipayan Sanyal, Chief Scientist &amp; Chairman, ICG-CGCRITutorial</p> <p>Welcome address: Director, CGCRI: 10 min</p> <p>Address by Chief Guest: Prof. Dipankar Banerjee, Chairman, RC :15 min</p> <p>Address by Guest of Honor: Prof. Alicia Duran, President ICG: 15 min</p> <p>Remarks on ICG-CGCRITutorial 2021: Prof. R. Conradt, Prof. J. M. Parker and Prof. Ana C M Rodrigues: 15 min</p> <p>Vote of thanks: Mr. Sitendu Mandal, Chief Scientist &amp; Organizing Secretary, ICG-CGCRITutorial : 5 min</p>			18.01.2021 3:50-4:50 PM
Break 10 min			

	Student Introduction - I			18.01.2021 5:00-6:00 PM
Break 10 min				
	Student Introduction - II			18.01.2021 6:10-7:10 PM
1.	Phase equilibria and chemical activities in glass melts	Prof. R. Conradt	UniglassAC GmbH, Aachen, Germany	18.01.2021 7:20-8:20 PM
<b>Day 2 19th January 2021 (Tuesday)</b>				
	Interaction with students and allocation of Projects	Coordinator: Prof. J. M. Parker	Sheffield University, Sheffield, U.K.	19. 01.2021 3:50-4:50 PM
Break 10 min				
2.	Evolution of theories on glass structure	Alicia Duran	CSIC, Spain	19.01.2021 5:00-6:00 PM
Break 10 min				
3.	Thermodynamics and energy demands for batch to melt conversion	Prof. R. Conradt	UniglassAC GmbH, Aachen, Germany	19.01.2021 6:10-7:10 PM
Break 10 min				
4.	Heat Transfer Phenomena in Glass Melting Processes	Prof. M. K. Choudhary	MKC Innovations LLC and The Ohio State University, USA	19.01.2021 7:20-8:20 PM

### Day 3 20th January 2021 (Wednesday)

5.	Chemical Durability of Glass	Prof. R. Conradt	UniglassAC GmbH, Aachen, Germany	20.01.2021 3:50-4:50 PM
Break 10 min				
6.	Optical Properties of Glass; Glass color and redox chemistry (I)	Prof. J. M. Parker	Sheffield University, Sheffield, U.K.	20. 01.2021 5:00-6:00PM
Break 10 min				
7.	Optical Properties of Glass; Glass color and redox chemistry (II)	Prof. J. M. Parker	CSIC, Spain	19.01.2021 6:10-7:10 PM
Break 10 min				
8.	Futuristic glasses	Prof. John Mauro	Pennsylvania State University, USA	20.01.2021 7:20-8:20 PM

### Day 4 21st January 2021 (Thursday)

Interaction with project students				21.01.2021 3:50-4:50 PM
9.	Neutron and X-ray diffraction studies of glass	Prof. R. Vacher	University of Montpellier, France	21.01.2021 5:00-6:00 PM
Break 10 min				
10.	Vibrations (I): basics of IR absorption, Brillouin and Raman scattering	Prof. B. Hehlen	University of Montpellier, France	21.01.2021 6:10-7:10PM
Break 10 min				
11.	Vibrations (II): relation with glass structure & properties	Prof. B. Hehlen	University of Montpellier, France	21.01.2021 7:20-8:20PM



## Day 5 22nd January 2021 (Friday)

12.	NMR technique for evaluation of glass structure (I)	Prof. P. Florian	CEMHTI-CNRS, France	22.01.2021 3:50-4:50 PM
Break 10 min				
13.	NMR technique for evaluation of glass structure (II)	Prof. P. Florian	CEMHTI-CNRS, France	22.01.2021 5:00-6:00PM
Break 10 min				
14.	Mechanical properties of glass	Prof. A. Varshneya	Saxon glass technologies, Alfred, USA	22.01.2021 6:10-7:10 PM
Break 10 min				
15.	Glass Strengthening Techniques	Prof. A. Varshneya	Saxon glass technologies, Alfred, USA	22.01.2021 7:20-8:20 PM

## Day 6 23rd January 2021 (Saturday)

Project Work				23.01.2021 5.00-8.00 PM
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## Day 7 25th January 2021 (Monday)

16.	Nuclear waste vitrification and chemical durability	Prof. R. J. Hand	Sheffield University, UK	25.01.2021 3:00-4:50 PM
Break 10 min				
17.	Modelling (I): Atomistic simulations	Prof. Akira Takada	Asahi Glass Yokohama - Japan	25.01.2021 5:00-6:00 PM
Break 10 min				

18.	Glass-Ceramics (I): Fundamentals of Nucleation and crystallization	Prof. E. D. Zanotto	Federal University of Sao carlos, Sao carlos, Brazil	25.01.2021 6:10-7:10 PM
Break 10 min				
19.	Glass-Ceramics (II): Advanced Applications	Prof. E. D. Zanotto	Federal University of Sao carlos, Sao carlos, Brazil	25. 01.2021 7:20-8:20 PM
<b>Day 8 26th January 2021 (Tuesday)</b>				
20.	Rare-earth doped glasses for photonic applications	Prof. S. Tanabe	Kyoto University, Japan	26.01.2021 3:50-4:50 PM
Break 10 min				
21.	Modelling (II): Relation with structure and properties	Prof. Akira Takada	Asahi Glass Yokohama - Japan	26.01.2021 5:00-6:00 PM
Break 10 min				
22.	Bioactive glass and glass- ceramic	Prof. A. R. Boccaccini	University of Erlangen- Nuremberg, Germany	26.01.2021 6:10-7:10 PM
Break 10 min				
23.	Ionic conductivity in Glasses	Prof. Ana C. M. Rodrigues	Federal University of Sao Carlos, Brazil	26.01.2021 7:20-8:20 PM

Day 9 27th January 2021 (Wednesday)	
Project Presentations 15 min talk+10 min interaction = 25 min for 3 Groups	27.01.2021 3:20-4:35 PM
Break 10 min	
Project Presentations 15 min talk+10 min interaction = 25 min for 3 Groups	27.01.2021 4:45-6:00 PM
Break 10 min	
Career opportunities in glass research/questionnaires	27.01.2021 6:10-7:10PM
Break 10 min	
Awards/Closing Ceremony	27.01.2021 7:20-8:20PM
End.....	

## Registration

The applications will be examined for registration eligibility. Selected candidates will be informed through their emails to deposit tutorial fees.

### Important Dates

Last date of application: 20 December 2020

Acceptance of application by 31 December 2020

Payment of registration fees by 08 January 2021

Confirmation of registration and tutorial link sharing: 15 January 2021

### Fee structure:

Indian Student: INR 1000.00

Employee of Indian Industry / Faculty: INR 2000.00

Foreign delegate: USD 50

For registration click on this link and submit your application

<https://icg-cgcri-tutorial2021.com/registration/>



## Person Contacts:

Organizing Secretary:

Mr. Sitendu Mandal  
Chief Scientist & Mentor  
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Project Planning and Business  
Development Division

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