GOKHALE MEMORIAL GIRLS' COLLEGE

Activity report of
EMERGING TRENDS IN CHEMICAL & MATERIAL SCIENCES

1. **Name of the Webinar:** EMERGING TRENDS IN CHEMICAL & MATERIAL SCIENCES
2. **Organized by:**The Department of Chemistry & The Department of Physics,
3. **Aim of the Webinar:**

   A two day National level webinar entitled "Emerging Trends in Chemical and Material Science "was organised by the Department of Chemistry and Physics on 28th and 29th June, 2020. In the midst of sever Covid pandemic where everyone was confined to their homes to maintain social distancing, the aim of this webinar was to bring students, researches and faculties from different colleges and Universities and research institutes under one roof for exchange of academic views and interests. The webinar in particular focused on the on-going research developments in the field of chemical and material sciences. The lectures were discussed on the development of advanced nanomaterial based gas sensors for environmental and biomedical applications , thermoelectric materials serving as potential candidates for providing solution to todays' energy challenge, application of inorganic photochemistry in chemical sensing and bio-imaging, synthesis, structure analysis and application of graphen.

4. **Date :**28th& 29th JUNE,2020
5. **Duration in hours (approximate): 6 hrs.**
6. **Number of Participants (approximate): 200**
7. **Name of Speakers with title of their speech, designation and Affiliation:**

Name of Speakers	Title of the speech	Designation	Affiliation
1. **Dr. SusmitaKundu**	**Advanced Nanomaterial Based Gas Sensors for Environmental and Biomedical Applications**	**Senior Scientist**	**Central Glass & Ceramic Research Institute**
2. **Dr. SnehadrinarayanKhatua**	**Applications of Inorganic Photochemistry in Chemical Sensing and Bioimaging**	**Assistant Professor**	**Department of Chemistry, North-Eastern Hill University,**

			Shillong, Meghalaya
3. Dr. Aritra Banerjee	**Manipulation of lattice thermal conductivity in Sb_2Te_3/graphite nanocompositethermoelectrics**	**Assistant Professor**	**Department of Physics, University of Calcutta**
4. Dr. Uday Narayan Maiti	**Atomic thin layers for sustainable future: Graphene and beyond**	**Assistant Professor**	**Department of Physics, IIT Guwahati**

8. **Sponsoring agency: Gokhale Memorial Girls' College**
9. **Sponsored amount: Rs. 4000/-**
10. **Outcome of the Webinar:**

WEBINAR REPORT DAY 1 (28/06/2020)

A two day National Web Seminar on " ***Emerging Trends in Chemical and Material Sciences***" was organised jointly by the Chemistry and Physics Department from 28th to 29th June, 2020 on Webex platform.

Session I

The audience were mainly researchers , undergraduate and post-graduate students, faculties of different colleges and Universities. The seminar started sharply at 3.00 p.m. and was anchored by Mr. Biswajit Chowdhury, Convenor, Webinar Organising Committee. He welcomed all the participants and was overwhelmed to see such an active participation at midst this painful pandemic outbreak.

A warm welcome address was given by our Principal Madam, Dr. Atashi Karpha, Chairperson, Webinar Advisory Committee. She emphasized on how a small virus called Covid-19 drastically changed our lifestyle. She also welcomed our eminent scientists and hoped that today's lecture would leave everyone in a happy mood.

Thereafter, Dr. Arijit De, Organising Secretary, Webinar Organising Committee introduced our first speaker ***Dr. Susmita Kundu***.

Dr. Susmita Kundu is a senior Scientist at CSIR-Central Glass and Ceramic Research Institute (CSIR-CGCRI). She received her Ph.D. degree on sol-gel thin films from Jadavpur University in the year 2009. She started her lecture on

"*Advanced Nanomaterial based gas sensors for environmental & Bio-medical Application*".

In recent years, the demand for gas sensors for safety control requirements and environmental monitoring has expanded enormously. In addition, for medical diagnosis the gas sensors have also opened up a new promising era. Nanomaterials

play an important role in fabrication of sensors for their advantage of high surface area and other unique properties. Among different types of sensors, nanostructured metal oxide semiconductors (MOS) based resistive sensors are more optimistic due to high sensitivity, low cost, robustness and portability.

Question & Answer session

After the illuminating talk by Dr. S. Kundu, there was a twenty minutes question and answer session conducted by Dr. Arijit De. The talk was well appreciated by the participants and they found it to be very useful and informative. We could feel the interest, excitement and enthusiasm of the participants as questions poured-in just after talk ended. We list below some of the questions asked by our participants.

1) How a thermal gun can sense the temperature of a body ?

2) What is the role of temperature in sensing mechanism ?

3) Explain the concept of Taguchi-type design for metal oxide gas sensor.

4) Why in some cases response function plot as function of time is not uniform springling to different sensivities?

Session II

The next session started at 4.25 pm with the introduction of our speaker Dr. Aritra Banerjee, by Dr. Gopa Dutta Pal, Member, Webinar Organising Committee.

After the introduction, Dr. Aritra Banerjee started his talk mentioning that it was his first exposure as speaker on online platform. He presented his talk on

"Manipulation of lattice thermal conductivity in Sb_2Te_3/graphite nanocomposite thermoelectrics"

The speaker first made us aware of the fact that almost seventy percent of the energy input from a power source get wasted out of which forty percent are due to heat losses. Thermoelectric materials are capable of converting this waste heat into electricity. They are special types of semiconductor materials that function as heat pumps and as heat to electricity converter. This makes the present study important from application perspective and would help in obtaining better thermoelectric material with improved performance.

Question & Answer session

The excellent talk was followed by a question answer session of 20 minutes conducted by Dr. Gopa Dutta Pal. We could feel the same zeal, appreciation and inquisitiveness in the participants in sharing their thoughts with the speaker. This time also the chat box overflowed with a number of questions some of which are mentioned below :

1) Why figure of merit is related to efficiency ?

2) How will the increase of debye frequency of the system help to increase the efficiency ?

3) Why Raman spectroscopy is more effective than XRD ?

4) Sb_2Te_3 layers have Vander wall bonds, so will it be more effective if well known Vander walls systems are used?

The first day of our webinar was finally concluded by Dr. Goutam.Mahata, Convener, Webinar Organising Committee. He summarized the talks and invited the participants again for an exciting session tomorrow.

WEBINAR REPORT DAY 2 29/06/2020

It was the second day of National Web Seminar on " Emerging Trends in Chemical and Material Sciences" organised jointly by the Chemistry and Physics Departments from 28th to 29th June, 2020..

Session I

The seminar started sharply at 3.00 p.m. and was anchored by Mr. Biswajit Chowdhury, Convenor, Webinar Organising Committee. He thanked the participants for attending yesterday's sessions and showing their patience and keen interest for today's talk.

The welcome address was given by Dr. Sanchita Sen, Co-ordinator, IQAC and member of Webinar Advisory Committee. She acknowledged the hardwork and meticulous preparation of the organizers for arranging such a national level seminar.

Thereafter, Dr. Goutam Mahata, Convenor, Webinar Organising Committee introduced our first speaker Dr. Snehadrinarayan Khatua.

After the brief introduction, Dr. S. N. Khatua thanked Dr. G. Mahata for the introduction and the organizers for inviting him to deliver his talk. He then started his lecture on

"Application of Inorganic Photochemistry in Chemical Sensing and bio-imaging". Design and synthesis of new probes for highly selective detection of cation, anion, bio-molecule and chemical warfare agents (CWAs) are crucial in various areas of application including environmental, waste management, biology, and national security. Luminescent metal complexes with d_6 electronic configuration, such as Ru(II)(ruthenium) and Ir(III)(iridium) are preferable for sensing, and bio-imaging application due to their rich photophysical/chemical redox properties, high solubility and stability in aqueous media, and good cell permeability.

The speaker elaborated the photochemistry of Ru(II) and Ir(III) complexes and reviewed recent works from his group on chemical sensing and bioimaging which covered bio-relevant species and chemical warfare agents detection using heteroleptic Ru(II) and cyclometalated Ir(III) polypyridine complexes. Lastly, he discussed about present challenges and future scopes in Metal oxide based sensors.

Question & Answer session

After the descriptive talk by Dr. S. N. Khatua, there was a twenty minutes question and answer session conducted by Dr. Goutam Mahata. We were amazed by the constant urge of the participants to understand as well as explore the subject matter. We list below few questions asked by our participants.

1) Do chemosensors/probes have applications in sensing and detection in forensic analysis and DNA test also?

2) What is protonation ?

3) What is the major difference between chemosensors and bio-sensors ?

4) What about processes in cyanide or silver ion sensors ? It seems to be an irreversible process of sensing as the binding is quite strong.

5) Is it possible to detect covid-19 using photosensors ?

6) Are chemosensors temperature dependent ?

Session II

The final session started at 4.21 pm with the introduction of speaker Dr. Uday Narayan Maiti, by Dr. Saurabh Niyogi, Jt. Secretary, Webinar Organising Committee.

After the brief introduction, Dr. U.N. Maiti started his talk. The title of his talk was

"*Atomic Thin Layers for Sustainable future : Graphene and beyond*"

The speaker introduced us to the world of graphene. He first explained how graphene can be sysnthesized. The material graphite consists of multiple atomic layers connected by Vander walls forces of interaction. When a single such layer is extracted , the resulting material is called graphene. Following the discovery of graphene, recently several analogous 2D materials have also been discovered; single layer of molybdenum disulphide, boron nitride, Titanium aluminium carbide (MXene), Silicene, and germanene are being few notable examples. This second round wave of discovery of 2D materials has led to new inventions and devices.

Question and Answer Session

The talk was elaborate as well as extremely lucid and gave an overall picture of the novel two dimensional material graphene and its exclusive properties. After the talk there was a question answer session of 20 minutes conducted by Dr. Saurabh Niyogi. We list below a few questions :

1) For a good capacitor charge separation rate is important and should be fast than charge recombination rate. Can that rate be controlled by inducing defects and/or doping ?

2) Carbon in graphene has been replaced by sulphur/nitrogen for designing better conducting nanomaterial. Can we replace carbon by selenium/alumunium instead?

3) How are water molecules used to separate graphene layers ?

4) Is there any good way to make borophene just like graphene ?

A valedictory speech was given by Dr. Anangamohan Panja, Jt. Secretary, Webinar Organising Committee. He briefly summarised the basic idea behind all the talks. He mentioned how nanomaterial based gas sensors have diverse environmental and biomedical applications, how thermoelectric materials are capable of meeting modern day's energy challenges and decreasing their thermal conductivity can noticeably enhance its performance. He further described the importance of inorganic photochemistry in areas of chemical sensors and bio-imaging. Finally he mentioned how graphene has emerged as a promising two dimensional material because of its unique properties and has brought a revolutionary change in energy storage capabilities of electronic devices.

The second day of the webinar came to a near end with a vote of thanks given by Mr. Biswajit Choudhury . He expressed his heartfelt thanks to the honourable speakers for exposing us to the fascinating world of chemical and material science, our Principal Madam Dr. Atashi Karpha for her constant inspiration without which the event would not have been possible , Dr. Sanchita Sen, Co-ordinator, IQAC,and the organizers for their continuous and tireless effort in making this event successful and our technician Mr. Akash Mondal for a cautious handling of the the e-platform.

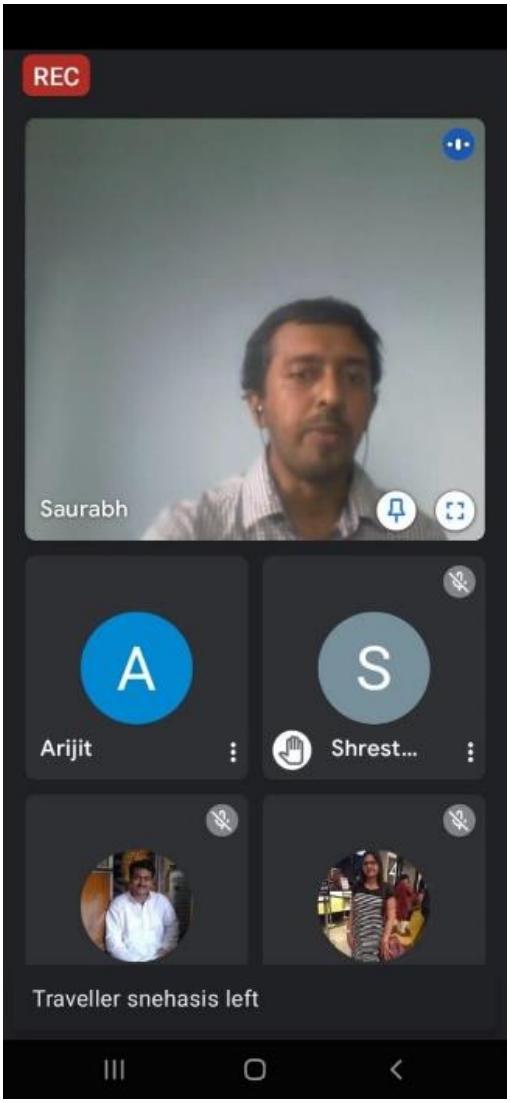
Finally, it was concluded by myself with the following deliberation

"We express our sincere gratitude to our distinguished speakers for making us aware of the modern day advancements in the field of research in chemical and material sciences and to our respected Principal Madam for her detailed guidance and never ending support for fruitful execution of the programme. A continuos and dedicated effort by all the members of the Webinar Organising Committee have made the programme a grand success."

11. Video link of the seminar:

https://youtu.be/uZZhRRwTWB4

https://youtu.be/ZpBQrydsCwo



GOKHALE MEMORIAL GIRLS' COLLEGE

Two- Days National Level Webinar

on

EMERGING TRENDS IN CHEMICAL & MATERIAL SCIENCES

Organized

by

The Department of Chemistry & Physics,

Gokhale Memorial Girls' College, Kolkata–20

DATE: 28th & 29th JUNE,2020

RESOURCE PERSONS

Dr. Susmita Kundu
Senior Scientist
Central Glass & Ceramic Research Institute,
Kolkata, W.B.

Dr. Snehadrinarayan Khatua
Assistant Professor
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North-Eastern Hill University,
Shillong, Meghalaya

Dr. Aritra Banerjee
Assistant Professor
Department of Physics,
University of Calcutta,
Kolkata, W.B

Dr. Uday Narayan Maiti
Assistant Professor
Department of Physics,
IIT, Guwahati, Assam

Registration is free and open from ……up to……
Link for Registration:……
Registration is limited up to 200 participants on first come first served basis.
Webinar Platform:……..
Webinar ink will be provided through e-mail after registration.
Registered participants will have to fill up feedback form for E-certificate.
E-certificate will be provided through registered e-mail within one week.
For more information contact-…….Phone No. 9433379228 / 9932541009/ 9647327357/ 7003096159/9936998863

GOKHALE MEMORIAL GIRLS' COLLEGE

ADVISORY COMMITTEE :

Chairperson: Dr. Atashi Karpha, Principal, Gokhale Memorial Girls' College
Co-ordinator : Dr. Sanchita Sen, IQAC, Gokhale Memorial Girls' College

ORGANIZING COMMITTEE :

Conveners: Mr. Biswajit Chowdhury, Assistant Professor, Dept. of Physics &
Dr. Goutam Mahata, Assistant Professor, Dept. of Chemistry
Organizing Secretary: Dr. Arijit De, Associate Professor, Dept. of Chemistry
Jt. Secretary: Dr. Anangamohan Panja, Assistant Professor, Dept of Chemistry &
Dr. Saurabh Niyogi, Assistant Professor, Dept. of Physics
Other Members: Dr. Gopa Dutta Pal, Contractual Fulltime Lecturer , Dept. of Physics
Dr. Shrabanti Dhar, Guest Lecturer, Dept. of Physics
Mr. Santanu Samanta, Guest Lecturer, Dept. of Chemistry

PROGRAMME SCHEDULE

TIME	DAY 1: PROGRAMME ON 28th JUNE,2020
3.00-3.05 pm	Welcome address will be given by Dr. Atashi Karpha, Principal, Gokhale Memorial Girls' College
3.05-3.10 pm	Introduction of the speaker by Dr. Arijit De, Organizing Secretary, Webinar Organizing Committee
3.10-3.50 pm	Lecture will be delivered by Dr. Susmita Kundu, Senior Scientist, Central Glass & Ceramic Research Institute on "Advanced Nanomaterial Based Gas Sensors for Environmental and Biomedical Applications".
3.50-4.05 pm	Question and Answer Session
4.15- 4.25 pm	Introduction of the speaker by Dr. Gopa Dutta Pal, Member, Webinar Organizing Committee
4.25-5.05 pm	Lecture will be delivered by Dr. Aritra Banerjee, Assistant Professor, Department of Physics, University of Calcutta on "Manipulation of lattice thermal conductivity in Sb_2Te_3/graphite nanocomposite thermoelectrics"
5.05-5.20 pm	Question and Answer Session

TIME	DAY 2: PROGRAMME ON 29th JUNE,2020
3.00-3.05 pm	Welcome Address will be given by Dr. Sanchita Sen, IQAC Co-ordinator, Gokhale Memorial Girls' College
3.05-3.10 pm	Introduction of the speaker by Dr. Goutam Mahata, Jt. Convener, Webinar Organizing Committee
3.10-3.50 pm	Lecture will be delivered by Dr. Snehadrinarayan Khatua, Assistant Professor, Department of Chemistry, North-Eastern Hill University, Shillong, Meghalaya on "Applications of Inorganic Photochemistry in Chemical Sensing and Bioimaging".
3.50-4.05 pm	Question and Answer Session
4.15- 4.20pm	Introduction of the speaker by Dr. Saurabh Neogi, Jt. Secretary, Webinar Organizing Committee
4.20-5.00 pm	Lecture will be delivered by Dr. Uday Narayan Maiti, Assistant Professor, Department of Physics, IIT Guwahati on "Atomic thin layers for sustainable future: Graphene and beyond"
5.00-5.15 pm	Question and Answer Session
5.15-5.20 pm	Valedictory Speech by Dr. Anangamohan Panja, Jt. Secretary, Webinar Organizing Committee
5.20-5.30 pm	Vote of thanks will be given by Mr. Biswajit Chowdhury, Convener, Webinar Organizing Committee