

हंसराज महाविद्यालय

दिल्ली विश्वविद्यालय
महात्मा हंसराज मार्ग,
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NAAC ACCREDITED 'A++' GRADE COLLEGE

2023-2024

Name of the Society: Chemical Society-Rasayanatva

Name of the Event: Webinar on “Green and Sustainable Chemistry.”

Date of the Event: January 20, 2024

Resource person: Prof. Ram Singh, Professor, Department of Applied Chemistry, DTU, Delhi.

**DEPARTMENT OF CHEMISTRY
RASAYANATVA**
The Chemical Society, Hansraj College,
University of Delhi
(NAAC ACCREDITED A++ GRADE, CGPA 3.71)

Organises a webinar on

**GREEN AND SUSTAINABLE
CHEMISTRY**

Date: 20th January, 2024
Time: 11 Am Onwards
Venue: Google Meet

GOOGLE MEETING LINK:
<https://meet.google.com/bze-mzdw-ovf>

Scan the QR Code to join!

Speaker:
Prof. Ram Singh
Professor, Department of Applied Chemistry,
Delhi Technological University, Delhi, India
Verified email at dtu.ac.in

Parton Prof.(Dr.) Rama Principal, HRC	Dr. Shailendra Kumar Singh Teacher -in-Charge	Dr.Monica Dinodia Chemical Society Convener	Dr.Sonu Kumar Webinar Convener
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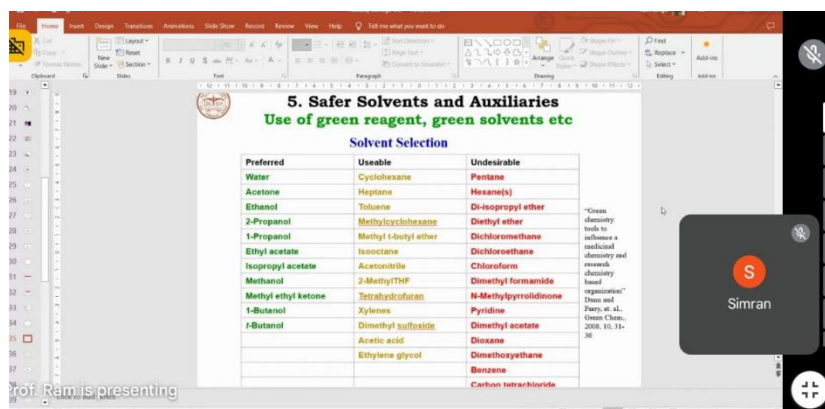
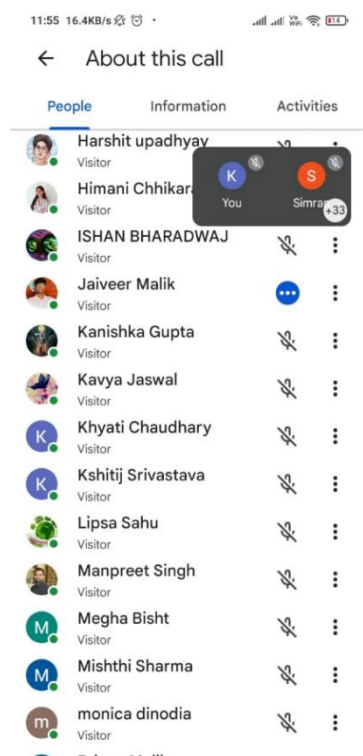
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On 20th January, 2024, a webinar was organized by Rasayanatva- The Chemical Society, Hansraj College from 11:00 a.m. onwards, through the online platform Google meet. Dr. Monica Dinodia (Convenor, Chemical Society) and Dr. Sonu Kumar (Co-ordinator) organised the webinar. The session was initiated with a special vote of welcome and gratitude for the respected speaker in the presence of the convenor of the society. This was followed with a brief introduction of Prof. Ram Singh, Professor, Department of Applied Chemistry, DTU, Delhi, his field of study and research. The session was highly informative where Sir offered his valuable insights towards developing efficient and safer technologies that is ecofriendly, use of safer solvents and auxiliaries. The speaker brilliantly explained the 12 principles of Green Chemistry with applications. Many illustrations of his own research work were also shown. This was followed with a doubt session with the students who actively showed their enthusiasm in it through participation. The event was thus concluded with a vote of thanks to the esteemed speaker, for sharing a part of his knowledge and time with the students by the convenor, Dr. Monica Dinodia. and special vote of thanks by Dr. Sonu Kumar to the principal madam and the participants. The resource person thanked the organizers for arranging the live webinar.



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Twelve Principles of Green Chemistry

In 1998, Paul Anastas and John C. Warner published a set of principles to guide the practice of Green Chemistry.

1. Prevention of waste/by-products
2. Atom Economy
3. Economy or minimization of hazardous products
4. Designing Safer Chemicals
5. Safer Solvents and Auxiliaries
6. Design for Energy Efficiency
7. Use of Renewable Feed-stocks
8. Avoid protection/de-protection
9. Use of Catalysts
10. Design for Degradation/biodegradable products
11. Strengthening of analytical techniques
12. Inherently Safer Chemistry for Accident Prevention

4. Designing Safer Chemicals

Chemical products should be designed to preserve efficacy of the function while reducing toxicity.

Antifoulants (Marine Pesticides)

Biocide

DCO

- Organotin compounds are chronically toxic to marine life and can enter food chain.
- They are bioaccumulative.
- Half-life in seawater is > 6 months.
- They are Non-bioaccumulative.
- Half-life in seawater is > 30 minutes.

Example: Polycarbonate Synthesis: Phosgene Process

- ◆ Disadvantages
 - phosgene is highly toxic, corrosive
 - requires large amount of CH₂Cl₂
 - polycarbonate contaminated with Cl impurities

Atom Economy

$$\% AE = \frac{\text{FW of atoms utilized}}{\text{FW of all reactants}} \times 100$$

Assume 100% yield.

100% formation of the desired epoxide product is recovered.

100% formation of the co-product: m-chlorobenzoic acid

A.E. of this reaction is 23%.

77% of the products are waste.

100% AE

- ✓ Rearrangement reactions
- ✓ Addition reactions

GREEN AND SUSTAINABLE CHEMISTRY

Ram Singh, PhD
Professor
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Polycarbonate Synthesis: Solid-State Process

Phenol + Carbondioxide $\xrightarrow{\text{Catal. Sci. Technol., 2011, 118-141}}$ Diphenylcarbonate

- ◆ Advantages
 - Diphenylcarbonate synthesized without phosgene
 - Eliminates use of CH₂Cl₂
 - Higher-quality polycarbonates

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Attendance list of students present in the webinar:

1. Monica Dinodia
2. Ishan Bharadwaj
3. Aman Dharmnath Roy
4. Anamika Saini
5. Simran
6. Anju Soni
7. Ankit Kumar
8. Anuj Kumar
9. Prateek Chaurasia
10. Prince Kumar Sharma
11. Prince Malik
12. Mishthi Sharma
13. Deepak Gupta
14. Ekta Pandey
15. Gehna Ratra
16. Harshit Upadhyay
17. Lucky Panwar
18. Karan Kumar
19. Khushi Gupta.
20. Shivi Garg
21. Manpreet Singh
22. Nehanth Yenneti
23. Megha Bisht
24. Sonu Kumar
25. Sukhmanpreet Kaur
26. Ritika Yadav
27. Kshitij Shrivastava
28. Khyati Choudhary
29. Pratibha Pandey
30. Lipsa Sahu
31. Karan Mehra
32. Kanishka Gupta
33. Aanchal Gupta
34. Anushka Sharma
35. Harshit Upadhyay
36. Bhawana Yadav
37. Garv Jain
38. Yashika
39. Khushi Biswas
40. Garv Pahuja