Dr. Jyotsna Chaturvedi - Curriculum Vitae

Department of Science and Technology (DST) - **Women Scientist A**

Dept of Inorganic and Physical Chemistry(IPC), Indian Institute of Science (IISc), Bangalore-560012

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RESEARCH INTERESTS.

Product development – electrode development for hydrogen production through water splitting. Heterostructures and functional-nanomaterials synthesis and characterization for energy applications (Green hydrogen, optoelectronic devices, etc.).

KEY PUBLICATIONS IN THE AREA OF RESEARCH INTERESTS

1. **Surface modulation, optics and electrochemical hydrogen evolution studies on CdS-Ag_2S superlattices [IF- 12.1]**
   Jyotsna Chaturvedi*, Akkarakkaran Thayyil Muhammed Munthasir, Laxmi Narayan Tripathi, Masuda U., Balaji R. Jagirdar, Pakkirisamy Thilagar, Arpan Kumar Nayak *Small* **2026**, e73427.
2. **Shape and phase-controlled one-pot synthesis of air stable cationic AgCdS nanocrystals, optoelectronic and electrochemical hydrogen evolution studies [IF- 9.1]**
   Jyotsna Chaturvedi*, Akkarakkaran Thayyil Muhammed Munthasir, Arpan Kumar Nayak, Laxmi Narayan Tripathi, Pakkirisamy Thilagar, Balaji R. Jagirdar, *Small methods* **2024**, 8, 2300907.
3. **Photo-electrochemical green-hydrogen generation: fundamentals and recent developments [IF- 8.2]**
   Sourav Baiju, Masuda U, Sumit Datta, Kartick Tarefder, **Jyotsna Chaturvedi,** Seeram Ramakrishna and Laxmi Narayan Tripathi* *International Journal of Hydrogen Energy, Elsevier BV, **2023**,* 51, 779-808.
4. **Book Chapter: Theoretical Considerations of 2D Materials in Energy Applications**
   Harsha Rajagopalan, Sumit Dutta, Sourabh Barua, Pawan Kumar Dubey, **Jyotsna Chaturvedi**, Laxmi Narayan Tripathi*, *Book:2D Nanomaterials, Edition- 1st Edition, First Published: **2022**, CRC Press, Pages20, eBook ISBN: 9781003178453*

Post-doctoral Research Experiences (Total of six years)

1. DST-WOSA-POSTDOCTORAL FELLOW- (2020-2024)

Title of the Project: "Synthesis and optoelectronic studies of metal chalcogenides nanostructures."

Key achievements:

1. **Experimental work on functional materials for energy applications -** Demonstrated shape and phase-controlled one-pot synthesis of air-stable cationic AgCdS nanocrystals and studied optoelectronic and electrochemical hydrogen evolution properties. The hydrogen evolution reaction through the water-splitting reaction was demonstrated. The research was published in a reputed journal of impact factors IF-14.2 and I am the corresponding and First Author of the paper. (Small methods, Wiley Interscience, 2300907, **2023**).
2. **Review Article and Book Chapter on Hydrogen Production:** I was a co-author of a review article (Q1 journal. Impact factor- 7.2) and a book chapter with collaborators at VIT-Vellore on Photoelectrochemical hydrogen production.
3. **Surface modulation, optics and electrochemical hydrogen evolution studies on CdS-Ag2S superlattices [IF- 12.1]**
   Jyotsna Chaturvedi*, Akkarakkaran Thayyil Muhammed Munthasir, Laxmi Narayan Tripathi, Masuda U., Balaji R. Jagirdar, Pakkirisamy Thilagar, Arpan Kumar Nayak Small **2026**, e73427.
4. **Direct visualization of phase transfer in Cationic AgCdS alloy nanocrystals under the electron beam.** (submitted Nanoscale 2026…)
5. **Thermoelectric studies on the AgCdS alloy nanocrystals** (under preparation)

2. S. KOTHARI POST DOCTORAL FELLOW (2011-01 - 2014-01)

Host institute: Indian Institute of Science, Bangalore, India (Mentor: Prof. Balaji R. Jagirdar) Title of the project: Synthesis, characterization of intermetallic quantum dots and possible application in solar cell/water splitting.

Key achievements:

1. Synthesis and characterization of different sizes and capping molecules of inter-metallic quantum dots using a single precursor source method.
2. Optical, thermal, electrical, and electron microscopy studies of inter-metallic quantum dots.

3. CSIR- SENIOR RESEARCH FELLOW (2010-04 - 2011-06)

Host Institute: Banaras Hindu University, Varanasi, India. (Mentor: Professor Subrato Bhattacharya) Project title: "Synthesis, characterization of metal thiocaboxylates as a single source precursor of metal sulfides".

4. UGC project fellow (2006-07 - 2009-07) Banaras Hindu University, Varanasi, India (Mentor: Professor Subrato Bhattacharya) Project title: "Preparation and Studies on Molecular precursors of Heterobimetallic Sulfides".

EXPERIMENTAL SKILLS

1. Nanomaterial synthesis and characterization
2. Water splitting, semiconductor optoelectronics
3. I am an expert in semiconductor nanomaterial synthesis under an inert atmosphere by using the Schlenk line technique.
4. Transmission electron microscopy (HR TEM, STEM, HAADF, EDS), PXRD, SEM, EPMA, Thin film (Spin/dip coating), Confocal/ UV-vis/ photoluminescence. TGA/DTA.
5. Electrical measurement 2 probe/4 probe on workstation.

Educational Qualifications

- CSIR- Senior Research Fellow- Inorganic Chemistry- Department of Chemistry, Banaras Hindu University, Varanasi- 221005, India.
- Doctor of Philosophy- **May 2010**, Inorganic/Organometallic Chemistry, Banaras Hindu University, Varanasi- 221005.

  Thesis Title: *"Synthesis, Structural features and Properties of Thiocarboxylate Derivatives of Some late Transition and main group metals".*

  Research Supervisor- Professor Subrato Bhattacharya.

Research Publications

1. **Jyotsna Chaturvedi*,** Akkarakkaran Thayyil Muhammed Munthasir, Laxmi Narayan Tripathi, Masuda U., Balaji R. **Jagirdar,** Pakkirisamy Thilagar, Arpan Kumar Nayak
   Surface modulation, optics and electrochemical hydrogen evolution studies on CdS-Ag_2S superlattices, *Small* **2026**, e73427 **[IF- 12.1]**
2. **Jyotsna Chaturvedi*,** Akkarakkaran Thayyil Muhammed Munthasir, Arpan Kumar Nayak, Laxmi Narayan Tripathi, Pakkirisamy Thilagar, Balaji R. Jagirdar, **Shape and phase-controlled one-pot synthesis of air stable cationic AgCdS nanocrystals, optoelectronic and electrochemical hydrogen evolution studies,** *Small methods* **2024**, 8, 2300907. **[IF- 9.1]**
3. Sourav Baiju, Masuda U, Sumit Datta, Kartick Tarefder, **Jyotsna Chaturvedi,** Seeram Ramakrishna, Laxmi Narayan Tripathi
   Photo-electrochemical green-hydrogen generation: fundamentals and recent developments *International Journal of Hydrogen Energy, Elsevier BV*, **2023**, 51, 779-808 **[IF- 8.3]**
4. Harsha Rajagopalan, Sumit Dutta, Sourabh Barua, Pawan Kumar Dubey, **Jyotsna Chaturvedi**, Laxmi Narayan Tripathi
   Book Chapter: Theoretical Considerations of 2D Materials in Energy Applications *Book:2D Nanomaterials, Edition- 1st Edition, First Published: 2022, CRC Press*, Pages20, eBook ISBN: 9781003178453.
5. Ratna Chauhan, **Jyotsna Chaturvedi**, Manoj Trivedi, Jyoti Singh, Kieran C. Molloy, Gabriele Kociok-Koehn, Dinesh P. Amalnerkar, Abhinav Kumar
   New single-source precursor for bismuth sulfide and its use as low-cost counter electrode material for dye-sensitized solar cells. *Inorg. Chim. Acta*, **2015,** 430:168–175. [**IF- 3.2**]
6. Geetika Gupta, **Jyotsna Chaturvedi**, Subrato Bhattacharya
   Geometrically unprecedented 3-, 5-and 7-membered Hg(ii)-Cu(i) and Hg(ii)-Ag(i) thiolate clusters: precursors to intermetallics. *Dalton Trans.,* **2015**, 44(19):8932–8937. [**IF- 3.3**]
7. Suryabhan Singh, **Jyotsna Chaturvedi,** Subrato Bhattacharya
   New ternary compounds containing Zn-Cu and Zn-Ag from single molecular source precursors. *RSC Adv.*, **2014**, 4(22):11469– 11474. [**IF- 4.6]**

8. Suryabhan Singh, **Jyotsna Chaturvedi,** A. S. Aditya, N. Rajasekhar Reddy, Subrato Bhattacharya. Syntheses and structural studies of heterobimetallic thiocarboxylate complexes containing zinc and copper. *Inorg. Chim. Acta*, **2013**, 396:6–9. [**IF- 2.8**]
9. Suryabhan Singh**, Jyotsna Chaturvedi**, Subrato Bhattacharya. Syntheses and structural studies of heterobimetallic thiocarboxylate complexes containing zinc and silver. *Inorg. Chim. Acta*, **2013**, 407:31–36, October. [**IF- 3.2**]
10. Suryabhan Singh, **Jyotsna Chaturvedi**, Subrato Bhattacharya. Solvent dependent crystallization of a few Hg(ii) thiocarboxylates. *Inorg. Chim. Acta*, **2012**, 385:112–118, April. [**IF- 3.2**]
11. Suryabhan Singh, **Jyotsna Chaturvedi**, and Subrato Bhattacharya. Studies of synthesis, structural features of cu(i) thiophene-2-thiocarboxylates and unprecedented desulfurization of cu(ii) thiocarboxylate complexes. *Dalton Trans*., **2012**, 41(2):424–431. [**IF- 3.3]**
12. **Jyotsna Chaturvedi**, Suryabhan Singh, Subrato Bhattacharya, Heinrich Noeth. The chemistry of cadmium-thiocarboxylate derivatives: Synthesis, structural features, and application as single source precursors for ternary sulfides. *Inorg. Chem.,* 2011, 50(20):10056–10069. [**IF- 4.7**]
13. Suryabhan Singh, **Jyotsna Chaturvedi**, Subrato Bhattacharya, Heinrich Noeth. Silver(i) catalyzed oxidation of thiocarboxylic acids into the corresponding disulfides and synthesis of some new Ag(I) complexes of thiophene-2-thiocarboxylate. *Polyhedron,* 2011, 30(1):93–97. [**IF- 2.6**]
14. **Jyotsna Chaturvedi,** Subrato Bhattacharya, and Rajendra Prasad. Novel heterobimetallic thiocarboxylato complexes: synthesis, characterization, and application as single source precursor for ternary chalcogenides. *Dalton Trans.,* **2010**, 39(37):8725–8732. [**IF- 3.3**]
15. **Jyotsna Chaturvedi**, Subrato Bhattacharya, and M. Nethaji. Synthesis of a one-dimensional coordination polymer containing pendant hydrosulfide groups. *Dalton Trans.,* **2009**, (38):8018– 8024 [**IF- 3.3**]
16. **Jyotsna Chaturvedi**, Subrato Bhattacharya, and M. Nethaji. A new reaction of dithiocarbamates: CS_2 elimination and two C-C bond formations, *Inorg. Chem. Commun.,* 2008, 11, 7, 720-722. [**IF- 5.4**]

MANUSCRIPT UNDER REVIEW-

17. **Jyotsna Chaturvedi*,** Balaji R. Jagirdar **Direct visualization of phase transfer in Cationic AgCdS alloys nanocrystals under an electron beam (Nanoscale under review)**

References:

1. **Professor Subrato Bhattacharya,**

   Department of Chemistry,

   Institute of Science,

   Banaras Hindu University,

   Varanasi-221005.

   Email. - s_bhatt@bhu.ac.in

2. **Professor Balaji R. Jagirdar,**

   Department of Inorganic and Physical Chemistry,

   Indian Institute of Science,

   Bangalore- 560012.

   Email- jagirdar@iisc.ac.in

3. **Dr. Laxmi Narayan Tripathi**

   Department of Physics,

   Vellore Institute of Technology,

   Vellore, Tamil Nadu.

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