

Dr. Sarabjot Kaur Makkad

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Date of Birth: 31.12.1989

Nationality: Indian

Marital Status: Married

❖ **ACADEMIC PROFILE:**

CSIR-National Chemical Laboratory, Pune, M.H	Functionalized Fluorescent Polystyrene Nanobeads for Sensing and Bio-imaging Applications	Ph.D.	Awarded (9.39) CGPA	2013-2019
School of Chemical Sciences, DAVV, Indore, M.P	Chemistry	Master of Science (M.Sc.)	8.51 (CGPA)	2010–2012
Govt. Autonomous Holkar Science College, Indore, M.P	Chemistry	Bachelor of Science (B.Sc.)	87.1 %	2007-2010

❖ **AWARDS AND FELLOWSHIPS:**

- ✓ Shyama Prasad Mukherji Research Fellowship through *Joint CSIR-UGC NET-JRF*, June, **2013**. Qualified CSIR-JRF with 8th All India Rank
- ✓ Qualified *Graduate Aptitude Test in Engineering (GATE)*, **2013**.
- ✓ *PG Merit Scholarship* for University Rank Holder by UGC, **2011**.
- ✓ Secured First position in both *UG*, **2010** and *PG* courses, **2012** .

- ✓ Got selected in *CGPSC* and posted as *Assistant Professor* in Govt. NPG Science College, Raipur (C.G), **2017 (Permanent position)**.
- ✓ Got eight awards for academics in undergraduate course, i.e. Dr. Deshpandey Smriti award, Prof. Daniel Robert Smriti award, Dr. Shankar Shridhar award, Dr. Sharik Sheikh award, Shri Sameer Chitnis award *etc.*
- ✓ Four year degree course in Classical Music from IKSVV.

❖ RESEARCH INTERESTS:

1. Targeted synthesis of fluorophores.
2. Covalent incorporation of fluorophores into the polymer matrix using miniemulsion polymerization.
3. Functional polymer nanomaterials and their application for chemical and bio-sensing.
4. Application of polymer nanomaterials as cell markers.
5. Stimuli responsive thiol-ester nanomaterials for fluorophore directive bio-imaging.
6. Synthetic strategies to overcome the limitations of self-assembled nanomaterials.

❖ RESEARCH AND ANALYTICAL EXPERTISE:

- Synthesis of fluorescent fluorophores through multi-step synthesis and their purification.
- Characterization of fluorophores through spectroscopic analyses viz. NMR, IR, UV-vis, *etc.*
- Synthesis of polystyrene nanobeads in the size range of 100-200 nm using miniemulsion polymerization.
- Detailed characterization of PS nanobeads through DLS, SEM, TEM, GPC *etc.*
- Application of fluorescent PS nanobeads as cell markers.
- Detailed photophysical studies using absorption and emission spectroscopy.
- Targeted functionalization and surface decoration of PS nanobeads.
- PS nanobeads for dual-distinct chemical sensing.
- Designing novel amphiphilic homopolymer surfactants for stabilizing emulsion.
- Functional fluorescent PS nanobeads for visual detection of bilirubin in human blood serum.
- Chemical study and characterization of functional polystyrene nanobeads.
- Synthesizing diblock polymers using Reversible addition fragmentation chain transfer (RAFT) polymerization.
- Expertise in handling polymerization through Schlenk line.
- Handling and operation of instruments like fluorescence spectrophotometer (Horiba Jobin Yvon Fluorolog), Gel Permeation chromatography (Viscotek VE 3580), GC-MS instrument (Agilent), DLS (both zeta-potential and size, Malvern), TGA (SDT Q600 TG-DTA), Contact angle and surface tension measurement instrument *etc.*

- Representation of experimental data through easy-understandable scientific graphics and cartoons.

❖ RESEARCH PUBLICATIONS:

1. Makkad S.K., Asha S.K. π -Conjugated Chromophore Incorporated Polystyrene Nanobeads as Single Optical Agent for Three Channel Fluorescent Probe in Bioimaging Application. *ACS Biomater. Sci. Eng.* **2017**, *3*, 1788-1798.
2. Makkad S. K., Asha S.K. Surface Functionalized Fluorescent PS Nanobead based Visual Dual Distinct Sensor for the detection of Volatile Organic Compounds. *Anal. Chem.* **2018**, *90*, 7434-7441.
3. Makkad S. K., Asha S.K. Designed Amphiphilic Polymer as Surfactant for Miniemulsion Polymerization of Oligo (p-phenylene vinylene) Incorporated Polystyrene Nanobeads for Water Based Visual Detection of Bilirubin. *ACS Applied Polymer Materials* **2019**, *1*, 1230-1239.
4. Sarabjot Kaur Makkad. Amine Decorated Polystyrene Nanobeads incorporating π -Conjugated OPV Chromophore for Picric acid Sensing in Water. *RSC Advances*, **2020**, *10*, 6497 - 6502.
5. Sarabjot Kaur Makkad. Fluorescent Polystyrene Nanoparticles For Bio-imaging Applications (Expert Opinion). *Pharmaceutical Resonance*, **2021**, *3*, 3-4.

❖ PATENTS AND INVENTION DISCLOSURES:

1. Makkad S. K., Asha S. K. Fluorescent Polymer For Visual Solid State Sensing of Volatile Organic Compounds (US20210088449) has been **granted** in US with grant number **11427661** on 30/08/2022.
2. Makkad S. K., Asha S. K. Fluorescent Polymer For Visual Solid State Sensing of Volatile Organic Compounds (IN201811006753) has been **granted** in India with grant number **452076** on 15/09/2023.
3. Makkad S. K., Asha S. K. A Process for Simultaneous Visual Detection of Fluoride and Arsenic ion using Carbon Quantum Dots (201811007112) has been **granted** in India with grant number **457489** on 09/10/2023.
4. Makkad S. K., Asha S. K. Multicolor Emitting Polymer Beads And Applications Thereof. (Published in India (IN/12/2017 India) on 24/03/2017).

5. Makkad S. K., Asha S. K. Water Soluble Polymer Surfactant For Synthesis of Polystyrene Nanobeads Toward Detection of Bilirubin in Human Serum US20210255206A1 has been **granted** with grant number **11719709** on 08/08/**2023**.

❖ **CONFERENCE/ FDP/ SEMINAR ATTENDED:**

1. Poster presentation at the MACRO-2017 conference held in Trivandrum, Kerala, **2017**.
2. Poster presentation at CSIR-National Chemical Laboratory, Pune on National Science Day, **2017**.
3. Poster presentation at reputed SPSI-MACRO-2018 conference held at IISER , Pune and CSIR-NCL, Pune, **2018**.
4. Participated in 3 weeks Orientation Program conducted by HRDC, Pt Ravi Shankar Shukla University (UGC-Sponsored) from 25-07-2019 to 14-08-**2019**.
5. Participated in 1 week Short Term Training Program (STTP), held at National Institute of Technology, Raipur, **2019**.
6. Participated in 2 weeks Faculty Development Program (FDP) at Govt. NPG Science College, Raipur, **2019** on Research Methodology.
7. Oral presentation at 56th Annual Convention of Chemists organized by Indian Chemical Society and International Conference on Recent Trends in Chemical Sciences (16/11/**2019**). Got Young scientist award (Shri B.M.L. Bhasin Memorial Award).
8. Sarabjot Kaur. Oral presentation at an International Conference on Materials for Environment (ICME-2020) organized by Govt. VYT PG Autonomous College funded by DAE-BRNS, BARC and CG-COST, **2020**.
9. Participated in 2 weeks Refresher Program in Chemical Sciences conducted by HRDC, Deen Dayal Upadhyay Gorakhpur University (UGC-Sponsored) from 11-09-2021 to 24-09-**2021**.
10. Participated in 1 week online ATAL Academy Faculty Development Program (FDP) at University College of Engineering Osmania University, **2021**.
11. Sarabjot Kaur. Oral presentation at International E-conference on Sustainable and Futuristic Materials (SFM-2021) organized by the International research center and Department of chemistry Kalasalingam Academy of research and Education, Krishnankoil, **2021**.

12. Sarabjot Kaur. Oral presentation at International conference on recent trends in Chemistry and chemical education organized by Department of Chemistry. Sikkim Manipal Institute of Technology and Association of Chemistry Teachers (ACT) **2021**.
13. Sarabjot Kaur. Oral presentation at an International webinar on recent trends in Science and Technology organized by Govt. VYT PG Autonomous College and Siddhachalam Laboratory, Raipur (CG), **2021**.
14. Participated in 2 weeks online Faculty Development Program (FDP) in Chemical sciences at Ramanujan College, University of Delhi, **2022**.
15. Participated in 1 week online Faculty Development Program (FDP) in Chemical sciences at Kamla Nehru Mahavidyalaya, Nagpur, **2022**.

DECLARATION:

I hereby declare that above mentioned information is true to the best of my knowledge and belief.

Date: 22-12-2023

Place: Raipur, India.

Sarabjot Kaur Makkad