PERSONAL PROFILE

Name: Dr. Subhadip Roy

Present address: Molecular Spectroscopy Laboratory, RIKEN, Room: S-402, Chemistry and Material Physics Building, 2-1 Hirosawa, Wako, Saitama 351-0198, Japan.

Permanent address: Professors's Colony, P.O: Kenduadihi, Dist: Bankura 722102, West Bengal, India.

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Education and Research

Postdoctoral Research Molecular Spectroscopy Laboratory, RIKEN. Research Topic: *Studies of Aqueous Interfaces Using Surface-Selective Vibrational and Electronic Spectroscopy*.	2022-till date
Ph.D. Homi Bhabha National Institute (HBNI), Bhabha Atomic Research Centre (BARC), Mumbai. Thesis title: *Studies of Metabolites and Ions at Aqueous Interfaces by Surface-Sensitive Spectroscopic Technique.*	2016-2021
M.Sc. with Physical Chemistry Specialization (1st Class with 86.92%), Sidho-Kanho-Birsha University (SKBU), West Bengal.	2015
B.Sc. in Chemistry (1st Class with 64.75%), The University Of Burdwan, West Bengal.	2013
Higher Secondary (1st Division with 79.40%) West Bengal Council Of Higher Secondary Education (WBCHSE), West Bengal.	2010
Secondary (1st Division with 93.25%) West Bengal Board Of Secondary Education (WBBSE), West Bengal.	2008

Research Interests:

Interface-Selective Nonlinear Spectroscopy: Vibrational sum frequency generation (VSFG), Electronic sum frequency generation (ESFG), heterodyne detection, air/water interface, dynamics at aqueous interface, modification of aqueous interface by amphiphiles and ions, interfacial phenomena concerning atmospheric and biological systems.

Hydration Shell Spectroscopy: Hydration shell water structure around small hydrophobes and ions using spontaneous Raman spectroscopy combined with difference spectroscopy with simultaneous curve fitting analysis (DS-SCF), 'structure making' and 'structure breaking' properties of ions, ion-pairing, temperature dependent hydration shell.

Skills and Expertise:

- Handling Broadband Heterodyne-Detected Vibrational Sum Frequency Generation (HD-VSFG) spectroscopy setup.
- Handling Heterodyne-Detected Electronic Sum Frequency Generation (HD-ESFG) spectroscopy setup.
- Experienced in handling commercial narrowband classical-VSFG (or homodyne-VSFG) spectroscopy setup (EKSPLA, Lithuania) based on picosecond Nd-YAG laser system (PL 2231-50).
- Developing spontaneous Raman spectrometer.
- Experienced in Difference spectroscopy with simultaneous curve fitting analysis (DS-SCF).
- Experienced in handling Lipids and surfactant monolayers.

Publications:

1. Adsorption of SARS-CoV-2 Spike (N501Y) RBD to Human Angiotensin-Converting Enzyme 2 at a Lipid/Water Interface.
   *Harison Rozak, Satoshi Nihonyanagi, Anton Myalitsin, **Subhadip Roy**, Mohammed Ahmed, Tahei Tahara, and Izabela I. Rzeznicka*
   J. Phys. Chem. B, 127, **2023***, 4406-4414*

2. Vibrational Raman Spectroscopy of the Hydration Shell of Ions.
   *Nishith Ghosh, **Subhadip Roy**, Anisha Bandyopadhyay and Jahur Alam Mondal*
   Liquids, 3, **2022***, 19-39*

3. Headgroup-Specific Interaction of Biological Lipid Monolayer/Water Interface with Perfluorinated Persistent Organic Pollutant (f-POP): As Observed with Interface-Selective Vibrational Spectroscopy.
   *Nishith Ghosh, **Subhadip Roy** and Jahur Alam Mondal*
   J. Phys. Chem. B, 126, **2022**, *563-571*

4. Interaction of Zwitterionic Osmolyte Trimethylamine N-oxide (TMAO) with Molecular Hydrophobes: An Interplay of Hydrophobic and Electrostatic Interactions.
   ***Subhadip Roy**, Animesh Patra, Dipak K. Palit and Jahur Alam Mondal*
   J. Phys. Chem. B, 125, **2021**, *10939-10946*

5. "Breaking" and "Making"of Water Structure at the Air/Water−Electrolyte ($NaXO_3$; X = Cl, Br, I) Interface.
   ***Subhadip Roy** and Jahur Alam Mondal*
   J. Phys. Chem. Lett., 12, **2021**, *1955-1960*

6. Kosmotropic Electrolyte (Na_2CO_3, NaF) Perturbs the Air/Water Interface through Anion Hydration Shell without Forming a Well-Defined Electric Double Layer.
   ***Subhadip Roy** and Jahur Alam Mondal*
   J. Phys. Chem. B 125, **2021**, *3977-3985*

7. Effects of Charge and Alkyl Chain Configuration on Hydrophobic Hydration: A Temperature-Dependent Raman Study.
   ***Subhadip Roy** and Jahur Alam Mondal*
   Asian Journal of Physics, 30, **2021**, *337-345*

8. Interaction of α-Synuclein with Phospholipids and the Associated Restructuring of Interfacial Lipid Water: An Interface-Selective Vibrational Spectroscopic Study.
   *Biswajit Biswas, **Subhadip Roy**, Jahur Alam Mondal, Prashant Chandra Singh*
   Angew. Chem. Int. Ed. 59, **2020**, *22731-22737*

9. Restructuring of Hydration Shell Water due to Solvent-Shared Ion Pairing (SSIP): A Case Study of Aqueous $MgCl_2$ and $LaCl_3$ Solutions.
   ***Subhadip Roy**, Animesh Patra, Subhamoy Saha, Dipak K. Palit, and Jahur Alam Mondal*
   J. Phys. Chem. B, 124, **2020**, *8141-8148*

10. Adsorption of Iodine Species (I_3^-, I^-, and IO_3^-) at the Nuclear Paint Monolayer−Water Interface and Its Relevance to a Nuclear Accident Scenario.
    *Subhamoy Saha, **Subhadip Roy**, P. Mathi, and Jahur A. Mondal*
    J. Phys. Chem. A, 124, **2020**, *6726-6734*

11. Dipolar small molecules at the air-water interface: A heterodyne-detected vibrational sum frequency generation (HD-VSFG) study.
    Subhadip Roy *and Jahur A. Mondal*
    Asian Journal of Physics, 29, **2020***, 287-294*

12. On the Behavior of Perfluorinated Persistent Organic Pollutants (POPs) at Environmentally Relevant Aqueous Interfaces: An Interplay of Hydrophobicity and Hydrogen Bonding.
    Nishith Ghosh, ***Subhadip Roy****, and Jahur A. Mondal*
    Langmuir, 36, **2020***, 3720-3729*

13. Observation of Extremely Weakly Interacting OH (∼3600 cm^{-1}) in the Vicinity of High Charge Density Metal Ions (M^{z+}; z = 1, 2, 3): A Structural Heterogeneity in the Extended Hydration Shell.
    Animesh Patra, ***Subhadip Roy****, Subhamoy Saha, Dipak K. Palit, and Jahur A. Mondal*
    J. Phys. Chem. C, 124, **2020***, 3028-3036*

14. Hydrophobic Hydration of Fluoroalkyl (C−F) is Distinctly Different from That of Its Hydrogenated Counterpart (C−H), as Observed by Raman Difference with Simultaneous Curve Fitting Analysis.
    Subhadip Roy*, Biswajit Biswas, Nishith Ghosh, P. C. Singh and Jahur A. Mondal*
    J. Phys. Chem. C, 123, **2019***, 27012-27019*

15. Polyatomic Iodine Species at the Air-Water Interface and Its Relevance to Atmospheric Iodine Chemistry: An HD-VSFG and Raman-MCR Study.
    Subhamoy Saha, ***Subhadip Roy****, P. Mathi, and Jahur A. Mondal*
    J. Phys. Chem. A, 123, **2019***, 2924-2934*

16. Heterodyne-Detected Vibrational Sum Frequency Generation Study of Air-Water-Fluoroalcohol Interface: Fluorocarbon Group-Induced Structural and Orientational Change of Interfacial Water.
    Subhadip Roy*, Biswajit Biswas, Jahur A. Mondal and Prashant Chandra Singh*
    J. Phys. Chem. C, 122, **2018***, 26928-26933*

17. Water in the hydration shell of cryoprotectants and their non-cryoprotecting structural analogues as observed by Raman-MCR spectroscopy.
    Nishith Ghosh, ***Subhadip Roy****, Mohammed Ahmed, Jahur A. Mondal*
    J. Mol. Liq., 266, **2018***, 118-121*

Chapters in books/bulletins:

1. Classical- and Heterodyne-Detected Vibrational Sum Frequency Generation (VSFG) Spectroscopy and Its Application to Soft Interfaces.
   Subhadip Roy*, Subhamoy Saha and Jahur Alam Mondal*
   Modern Techniques of Spectroscopy: Basics, Instrumentation and Applications, Progress in Optical Science and Photonics, Springer Singapore, 13, **2021***, 87-115*

2. Hydration of Ions and Cosolvents in the Bulk Water and at the air-Water Interface: A Water's Perspective.
   Subhadip Roy *and Jahur A. Mondal*
   ISRAPS Bulletin, 32, **2020***, 43-54*

Contributory papers in national/international conferences:

1. (a) Specific Ion Effect of Polyatomic Anions at Aqueous Interface: An "HD-SFG" And "RD-SCF" Study. (b) Alcohols at Aqueous Interface (Short vs. Long Chain) As Observed By "HD-VSFG" Spectroscopy.
   Subhadip Roy *and Jahur A. Mondal*
   15th DAE-BRNS Biennial Trombay Symposium on Radiation and Photochemistry (**TSRP-2020**), January 5-9, 2020, DAE Convention Centre, BARC, Mumbai, India.

2. Cosolvents at Aqueous Interface: As Observed by "Classical" and "Heterodyne-Detected" Vibrational Sum Frequency Generation Spectroscopy.
   Subhadip Roy *and Jahur A. Mondal*
   DAE-BRNS Theme Meeting on Ultrafast Sciences-2019 (**UFS-2019**), November 7-9, 2019, Victor Menezes Convention Centre (VMCC), IIT Bombay, India.

3. Osmolyte at Model Cell Membrane-Water Interfaces: A Combined HD-VSFG and Raman-MCR Study.
   Subhadip Roy *and Jahur A. Mondal*
   National Symposium on Radiation and Photochemistry (**NSRP-2019**), February 7-9, 2019, Visva-Bharati, India.

4. (a) How Fluorination Affects Hydrophobic Hydration: A Case Study of Fluorinated Alcohol Hydration. (b) Temperature Controlled Raman Multivariate Curve Resolution (Raman-MCR) Spectroscopy: A Powerful Technique To Probe Hydrophobic Hydartion.
   Subhadip Roy *and Jahur A. Mondal*
   7th International Conference on Perspectives in Vibrational Spectroscopy (**ICOPVS-2018**), November 25-29, 2018, DAE Convention Centre, Anushaktinagar, Mumbai, India.

5. Alcohol vs. Fluoroalcohol at Aqueous Interface: Structural and Orientational Transformation of Interfacial Water as Observed by Heterodyne-Detected Vibrational Sum Frequency Generation Spectroscopy.
   ***Subhadip Roy**, Biswajit Biswas, Jahur A. Mondal and Prashant Chandra Singh*
   DAE-BRNS Theme Meeting on Ultrafast Science-2018 (**UFS-2018**), October 22-24, 2018, Convention Centre, Raja Ramanna Centre for Advanced Technology (RRCAT), Indore, India.

6. Water at uncharged amphiphile-water interface: Heterodyne detected sum frequency generation study.
   ***Subhadip Roy**, Nishith Ghosh, Jahur A. Mondal*
   14th DAE-BRNS Biennial Trombay Symposium on Radiation and Photochemistry (**TSRP-2018**), Jan 3-7, 2018, DAE Convention Centre, Anushaktinagar, Mumbai, India.

Other conferences/workshops attended:

1. ACS Science Connect: Langmuir, 10-12 October, **2020**.

2. National webinar on "Current Challenges in Experimental Physical Chemistry", 31st July and 1st August, **2020**, Dept. of Chemistry, IIT (ISM), Dhanbad, India.

3. Global Initiative For Academic Networks (GIAN), February 26-March 05, **2019**, IIT Kanpur, India.

Awards and Fellowships:

- **Best Poster Award**: Dr. P. K. Bhattacharyya Memorial Award for the best-poster in Photochemistry, 15th DAE-BRNS Biennial Trombay Symposium on Radiation and Photochemistry, January 5-9, **2020**, DAE Convention Centre, BARC, Mumbai.
- **Best Poster Award** in DAE-BRNS Theme Meeting on Ultrafast Sciences-2019, November 7-9, **2019**, Victor Menezes Convention Centre (VMCC), IIT Bombay.
- **Best Poster Award** in National Symposium on Radiation and Photochemistry, February 7-9, **2019**, Visva-Bharati.
- **Best Poster Award** in DAE-BRNS Theme Meeting on Ultrafast Science-2018, October 22-24, **2018**, Convention Centre, Raja Ramanna Centre for Advanced Technology (RRCAT), Indore.
- **Senior Research Fellowship**-Department of Atomic Energy (DAE), Mumbai, Government of India (**2018-2021**).

- **Junior Research Fellowship**-Department of Atomic Energy (DAE), Mumbai, Government of India (**2016-2018**).
- Qualified in All-India CSIR-UGC test for Junior Research Fellowship and Eligibility for Lectureship (NET; All India CSIR Rank-**54**).

Personal information:

Gender:	Male
Marital Status:	Unmarried
Nationality:	Indian
Date of Birth:	03-08-1992
