

Curriculum Vitae

Name: Dr. Subham Bhattacharjee

Gender: Male

Date of Birth: 17-03-1986

Nationality: Indian

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Department of Chemistry

Kazi Nazrul University

Asansol

West Bengal

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Key Skills: *Preparation and applications of organo- and hydrogels, Organic polymer synthesis and characterization, Fabrication of polymer thin film, Catalysis, Multi-step organic synthesis, Strong communication and written skills, Strong analytical skills, Ability to work independently, Ability to do journal and patent search and analysis, Strong and demonstrated formulation development skill, Have passion, enthusiasm and optimistic work attitude*

Current Position

March, 2019 - present: Assistant Professor, Department of Chemistry, Kazi Nazrul University, Asansol, West Bengal.

Number of Ph.D. students working at present:

3 (Maximilan Patra, Soumen Kumar Dubey & Angshuman Ghosh)

Previous Research Background & Education

February 2016-February 2019 **Postdoc, Department of Chemical Engineering and Chemistry, Eindhoven University of Technology (TU/e), The Netherlands.** During this period, an industrial project on '3D-printing' with DSM, a Dutch multinational company, was successfully completed. In addition, extensive research work on design, synthesis and fabrication of nano-porous polymer thin film was performed and three papers had been published in high impact international journals.

Supervisor: [Prof. Dr. R. P. \(Rint\) Sijbesma](#)

Research Topics:

- ✚ Design, syntheses and application of nanoporous polymers based on polymerizable discotic liquid crystals.
- ✚ Probing interfacial damage in composites with mechanofluorescence.

- ✚ Covalent adaptable networks for improved sintering in selective laser sintering (SLS) processes.

August 2014-January 2016 **Research Associate (Postdoc), Organic Chemistry, Indian Institute of Science (IISc), India.** During this period, a collaborative project with Prof. C. N. R. Rao (Bharat Ratna) was successfully completed and a paper had been published in a renowned, high impact international journal.

Supervisor: **Prof. Dr. Santanu Bhattacharya**

2009-2014 **Ph.D., Organic Chemistry, Indian Institute of Science (IISc), India**
Thesis: “*Design, Syntheses and Applications of Novel Two-Component Gels and Soft-Nanocomposites*”

Supervisor: **Prof. Dr. Santanu Bhattacharya**


2007-2009 **M.Sc., Specialization: Organic Chemistry, Grade/%: 1st, 74%. University of North Bengal, West Bengal, India**

2004-2007 **B.Sc., Chemistry, Grade/%: 1st class 1st, 66.5%. Raiganj College, University of North Bengal, West Bengal, India**

Research Expertise

ORGANIC CHEMISTRY/CHEMICAL ENGINEERING

✚ **Organic Polymer Chemistry:** Design and multi-step synthesis of :

- Polymerizable discotic liquid crystals, their polymerization in the liquid crystalline phase, removal of the template to fabricate **nanoporous polymer** thin film. Characterization of the nanoporous polymer films by FT-IR, XRD, solid state ¹³C NMR and subsequent investigation of their potential applications;
- Mechanophore-functionalized filler particle in polymer matrix to probe **interfacial damage with mechanofluorescence**;
- Supramolecular, reversible telechelic polyesters based on covalent adaptable networks (CAN) to **improve the sintering** and hence extend the range of materials suitable for SLS. Characterization of the engineered polyesters by NMR, FT-IR, DSC, TGA, Rheology and Tensile testing to investigate their properties including thermal, mechanical and viscoelastic behaviors (in collaboration with  **DSM** (BRIGHT SCIENCE. BRIGHTER LIVING.)).

✚ **Supramolecular Organic Chemistry:** Exploring a diverse range of non-covalent interactions such as: **Hydrogen bonding, Halogen bonding, Metal ion coordination,**

Electrostatic, Charge transfer in addition to π - π and Van der Waals interactions to furnish a diverse class of organo- and hydro-gels. Characterization of the self-assembled materials and subsequent investigation of their potential applications. Understanding the structure-property relationship of the newly synthesized organic molecules and its effect on the various physical and optoelectronic properties.

✚ **Instrument handled:** NMR spectroscopy, FT-IR spectroscopy, Mass spectrometry and elemental analysis, UV/Vis spectroscopy, Fluorescence spectroscopy, Raman spectroscopy, Circular Dichroism spectroscopy, Differential Scanning Calorimetry (DSC; both for solution and solid samples), Atomic Force Microscopy (AFM) including Liquid AFM, Transmission Electron Microscopy (TEM), Polarized Optical Microscopy (POM), Fluorescence Microscopy, Veeco Optical Profilers, Malvern Zetasizer, Anton paar Rheometer, Powder X-ray Diffractometer (PXRD), Single Crystal X-ray Diffractometer.

THEORETICAL CALCULATIONS

✚ **Density functional theory (DFT):** To determine the optimum geometry, HOMO-LUMO energy levels of synthesized molecules (*Gaussian 03, ChemCraft 1.6*).

OTHER RELEVANT SKILLS

- ✚ **Computer:** Well-versed in software used for scientific writing, presentation, data analysis (Origin, GraphPad Prism, Office Excel, TextPad, etc), database searching (Pubmed, Scifinder and Reaxys), graphic handling (Paint, Photoshop, Blender 2.75, Chemdraw) and Movie/Video (Web Enhanced Object) making/editing.
- ✚ Experience in scientific writing including manuscripts in peer reviewed journals as well as patents.

Research Publications

1. Maxcimilan Patra, Soumen Kumar Dubey, Soumen Singha, Corrado Rizzoli, **Subham Bhattacharjee**,* Rajat Saha,* **Investigation of intermolecular interactions between $[\text{Ho}(\text{H}_2\text{O})_8]^{4+}$ based 3D metal-organic supramolecular host and bipyridyl guest through crystal structure and Hirshfeld surface analysis.** *Journal of Coordination Chemistry*, 2021, DOI: 10.1080/00958972.2021.1938016. **Impact Factor: 1.751.**
2. Maxcimilan Patra, Soumen Kumar Dubey, Bibhas Mondal, Kajal Gupta, Angshuman Ghosh, Subhankar Mandal, Satyajit Hazra, Ajit Kumar Meikap,* Ujjal Kanti Roy,* **Subham Bhattacharjee**,* Rajat Saha,* **Design of π -conjugated flexible semiconductive 2D MOF and MOF derived CuO nano-spheres for solvent free C-X (S, O) hetero-coupling catalysis with enhanced conductivity.** *Nano-Structures & Nano-Objects*, 2021, 26, 100756. **Impact per Paper (SNIP): 1.113.**
3. Nilanjan Dey, **Subham Bhattacharjee**, Santanu Bhattacharya*, **Addressing Multiple Ions Using Single Optical Probe: Multi-Color Response via Mutually**

- Independent Sensing Pathways.** *Chemistry Select*, 2020, 5, 452-462. **Impact factor:** 5.996.
4. Bappa Maiti, **Subham Bhattacharjee** and Santanu Bhattacharya*, **Palladium-induced transformation of nematic liquid crystals to robust metallogel comprising self-assembled nanowires.** *Chem. Commun.*, 2019, 55, 12651-12654. († **These authors contributed equally**) **Impact factor:** 5.996.
 5. Indre Urbanaviciute, Xiao Meng, Michal Biler, Yingfen Wei, Tim D. Cornelissen, **Subham Bhattacharjee**, Mathieu Linares, Martijn Kemerink*, **Negative piezoelectric effect in an organic supramolecular ferroelectric.** *Mater. Horiz.*, 2019, 6, 1688-1698. **Impact factor:** 14.356.
 6. Bappa Maiti,† **Subham Bhattacharjee**,† and Santanu Bhattacharya*, **Perfluoroarene Induces a Pentapeptidic Hydrotrope into a pH Tolerant Hydrogel Capable of Naked Eye Sensing of Ca²⁺ Ion.** *Nanoscale*, 2019, 11, 2223-2230. († **These authors contributed equally**). **Impact factor:** 7.367.
 7. Indre Urbanaviciute, **Subham Bhattacharjee**, Michal Biler, Jody A. M. Lugger, Tim D. Cornelissen, Patrick Norman, Mathieu Linares, Rint P. Sijbesma, Martijn Kemerink*, **Suppressing Depolarization by Tail Substitution in an Organic Supramolecular Ferroelectric.** *Phys. Chem. Chem. Phys.*, 2019, 21, 2069-2079. **Impact factor:** 3.906.
 8. **Subham Bhattacharjee**, Jody A. M. Lugger, Rint P. Sijbesma*, **Pore Size Dependent Cation Adsorption in a Nanoporous Polymer Film Derived From a Plastic Columnar Phase.** *Chem. Commun.*, 2018, 54, 9521-9524. **Impact factor:** 6.290.
 9. Jody A. M. Lugger, D. J. Mulder, **Subham Bhattacharjee**, Rint P. Sijbesma*, **Homeotropic Self-Alignment of Discotic Liquid Crystals for Nanoporous Polymer Films.** *ACS Nano*, 2018, 12, 6714-6724. **Impact factor:** 13.709.
 10. **Subham Bhattacharjee**, Jody A. M. Lugger, Rint P. Sijbesma*, **Tailoring Pore Size and Chemical Interior of Near 1 nm Sized Pores in a Nanoporous Polymer Based on a Discotic Liquid Crystal.** *Macromolecules*, 2017, 50, 2777-2783. **Impact factor:** 5.914.
 11. Indre Urbanaviciute, Xiao Meng, Tim D. Cornelissen, Andrey V. Gorbunov, **Subham Bhattacharjee**, Rint P. Sijbesma and Martijn Kemerink*, **Tuning the Ferroelectric Properties of Trialkylbenzene-1,3,5-tricarboxamide (BTA).** *Adv. Electron. Mater.*, 2017, 3, 1600530. **Impact factor:** 4.193.
 12. **Subham Bhattacharjee**, Bappa Maiti, Dipen Biswakarma and Santanu Bhattacharya*, **Gelation of Novel Pyrene-Cored Chiral Dendrimers: Dendritic Effect in Gelation and Shear Thinning Behavior.** *Macromol. Symp.*, 2016, 369, 14-18.

13. Subham Bhattacharjee, Bappa Maiti and Santanu Bhattacharya*, **First Report of Charge-Transfer Induced Heat-Set Hydrogel. Structural Insights and Remarkable Properties.** *Nanoscale*, 2016, 8, 11224-11233. Impact factor: 7.367.
14. Subham Bhattacharjee and Santanu Bhattacharya*, **The Remarkable Role of C—I···N Halogen-Bonding in Thixotropic 'Halo'gel Formation.** *Langmuir*, 2015, 57, 6973-6988. Impact factor: 3.789.
15. Subham Bhattacharjee and Santanu Bhattacharya*, **Role of Synergistic π - π Stacking and X—H···Cl (X = C, N, O) H-bonding Interactions in Gelation and Gel Phase Crystallization.** *Chem. Commun.*, 2015, 51, 7019-7022. Impact factor: 6.290.
16. Subham Bhattacharjee and Santanu Bhattacharya*, **Orotic Acid as a Useful Supramolecular Synthone for the Fabrication of an OPV Based Hydrogel: Stoichiometry Dependent Injectable Behavior.** *Chem. Commun.*, 2015, 51, 6765-6768. Impact factor: 6.290.
17. Subham Bhattacharjee and Santanu Bhattacharya*, **Charge Transfer Induces Formation of Stimuli-Responsive, Chiral, Cohesive Vesicles-on-a-String that Eventually Turn into a Hydrogel.** *Chem. Asian J.*, 2015, 10, 572-580. Impact factor: 3.692.
18. Subham Bhattacharjee, Suman K. Samanta, Parikshit Moitra, K. Pramoda, Ram Kumar, Santanu Bhattacharya* and C. N. R. Rao*, **Nanocomposite Made of an Oligo(*p*-phenylenevinylene)-Based Trihybrid Thixotropic Metallo(organo)gel Comprising Nanoscale Metal–Organic Particles, Carbon Nanohorns, and Silver Nanoparticles.** *Chem. Eur. J.*, 2015, 21, 5467-5476. Impact factor: 5.160.
19. Subham Bhattacharjee and Santanu Bhattacharya*, **Pyridylenevinylene Based Cu²⁺-Specific, Injectable Metallo(hydro)gel: Thixotropy and Nanoscale Metal–Organic Particles.** *Chem. Commun.*, 2014, 50, 11690-11693. Impact factor: 6.290.
20. Subham Bhattacharjee and Santanu Bhattacharya*, **Phthalate Mediated Hydrogelation of a Pyrene Based System: A Novel Scaffold for Shape-Persistent, Self-Healing Luminescent Soft Material.** *J. Mater. Chem. A*, 2014, 2, 17889-17898. Impact factor: 9.931.
21. Subham Bhattacharjee, Sougata Datta and Santanu Bhattacharya*, **Remarkable Regioisomer Control in the Hydrogel Formation from a Two-Component Mixture of Pyridine-End Oligo(*p*-phenylenevinylene)s and *N*-Decanoyl-L-alanine.** *Chem. Eur. J.*, 2013, 19, 16672-16681. Impact factor: 5.160.

Patents

22. **Subham Bhattacharjee**, Deepa Bhagat and Santanu Bhattacharya*, **Nanogels, Methods and Devices Thereof, For Managing *Holtrichia Consanguinea*. Indian Patent granted.** Application No. **201641024309 A**.
23. **Subham Bhattacharjee**, Deepa Bhagat, Dipen Biswakarma and Santanu Bhattacharya*, **A Reusable Charge-Transfer Based Agrogel. Indian Patent filed.** Application No. **201741016464**.
24. **Subham Bhattacharjee**, Deepa Bhagat and Santanu Bhattacharya*, **Nanogels, Methods and Devices Thereof, For Managing *Holtrichia Consanguinea*. Patent filed.** Application No. **PCT/IN2017/050290**.

Conference Presentation

- ✚ International Conference on Molecular Systems Engineering (ICMSE), University of Basel, Switzerland, 26-29 August 2017.
- ✚ International Symposium on Macrocyclic & Supramolecular Chemistry (ISMSC) in conjunction with ISACS: Challenges in Organic Materials & Supramolecular Chemistry, University of Cambridge, UK, 2-6 July 2017.
- ✚ Indo-US Symposium on Bio-inspired Supramolecular and Polymer Assembly, The Travancore Heritage, Kerala, India, December 15-17, 2013.
- ✚ Indo-US Symposium on Molecular Materials, Indian Institute of Science, Bangalore, India, July 15-17, 2013.
- ✚ Indo-US Workshop on “Advanced and Nano-Structured Materials” Kanada Hall, JNCASR, Bangalore, India, January 21-22, 2013.
- ✚ IISc-Centenary Conference, Indian Institute of Science, Bangalore, India, December 13-16, 2012.

Awards, Fellowship & Positions

- ✚ **Inspire Faculty Award in Chemistry on January 2018 call by Department of Science & Technology (DST), India.**
- ✚ Junior and Senior Research Associate Fellowship, IISc, August, 2014 to January 2016.
- ✚ **Junior and Senior Research Fellowship** (NET qualified with CSIR JRF, 2009), *Council of Scientific and Industrial Research* (CSIR), Govt. of INDIA, during Ph.D. 2009-2014.
- ✚ **All India Rank 10** in Graduate Aptitude Test of Engineering (**GATE**) in Chemistry (Percentile score 99.86) in the year 2009.
- ✚ **Post-Graduate Merit Scholarship** for university rank holder during M.Sc. (2007-2009) for securing the highest marks (1st class 1st) in B.Sc. in the North Bengal University, Siliguri, India (2007).

✚ **Gold Medal Award** for securing the highest marks in B.Sc. in the North Bengal University, Siliguri, India (2007).