

Research Interest

ANALYTICAL CHEMISTRY

Immobilization and Room Temperature Stabilization of Bio-molecules, Bio-Catalysts and Bio-active molecules.

Spectroscopic and Fluorescence properties of Bio-molecules and Bio-Catalysts in immobilized state.

Functionalization of silica gel; Immobilization of organic, bio-organic molecules and organic-catalysts.

Detection – Quantification of Toxic / Heavy metal ions and Rare earths in trace/ ultra trace level through Selective Separation and Preconcentration. Development of ion-exchange material and Adsorbent Materials.

NANO MATERIALS

Development of Nanomaterial having ion-exchange and photo-electronic properties.

HOMO-LUMO adsorption of high-low oxidation states.

Rationalisation of chemical properties in terms of DFT.

Research Group

Current Members

Sneha Mandal, Rimi Sarkar, Shailja Mishra, Sanchari Saha, Biswajit Hansda, Shrimoyee Dey

Previous Members

Dr. Dip Narayan Dutta, Dr. Susanta K Pandit, Dr. Niladri Ghosh, Dr. Sakuntala Chakraborty, Chandan Ghosh, Dr. Milan K Barman, Bhavya Srivastava, Mousumi Chatterjee, Dipika Roy.

List of Publications

1. Extraction Chromatographic Method of Preconcentration and Separation of Lead(II) with High Molecular Mass Liquid Cation Exchanger. *B. Mandal and N. Ghosh ; Desalination, Vol. 250, 2010, p 506-514.
2. Combined Cation-Exchange and Extraction Chromatographic Method of Pre-concentration and Concomitant Separation of Bismuth(III) with High Molecular Mass Liquid Cation Exchanger, Bhabatosh Mandal* and Niladri Ghosh, J. Hazard. Mater., 182, p363-370, 2010, doi: 10.1016 / j. jhazmat2010.06.041, vol. 182, 2010, page 363-370.
3. Combined Cation-Exchange and Extraction Chromatographic Method of Pre-concentration and Concomitant Separation of Cu(II) with High Molecular Mass Liquid Cation Exchanger after its online detection. (2011). B. Mandal*, U.S. Roy, D. Datta and N. Ghosh, Journal of Chromatography A, 1218, p5644– 5652, 2011 doi:10.1016/j.chroma.2011.06.083.
4. 'Role of river-derived algae on bioaccumulation in fixed bed reactors; a low-cost safe drinking water plant' Bhabatosh Mandal,* Chandan Ghosh, Uday Sankar Roy, Desalination and Water Treatment, 45, p343–350, (2012).
5. "Hydrogeochemistry of fluoride rich ground water in birbhum district of West Bengal, India." Pulak kumar Patra, Bhabatosh Mandal, and Sakuntala Chakraborty, Ecoscan, 4(2&3), p209-211, 2010. (Impact factor: 0.347).
6. Extraction Chromatographic method of preconcentration and separation of lead(II) with high molecular mass liquid exchanger , Versatic 10. B. Mandal* and U. S. Roy, Indian J. Chem. Sec. A, Vol. 47A, pp 1497-1502, 2008.
7. Extraction Chromatographic Separation of Gallium(III) with high molecular mass liquid cation exchanger SRS-100. Bhabatosh Mandal* and Niladri Ghosh, Indian J. Chem. Sec. A, Vol. 47A, pp 1041-1046, 2008.

8. Extraction Chromatographic Method of Preconcentration and Separation of Cadmium(II) with High Molecular Mass Liquid Cation Exchanger, Versatic 10. B.Mandal, N. Ghosh, Indian J Chem. Sec.A, Vol. 48 A, p668-671, 2009.
9. Extraction Chromatographic studies of Cerium(IV) with Aliquat-336, S.Acharya, B. Mandal, and U. S. Roy*, Chem. Environ. Res., Vol. 16, pp 151-160, 2007. (ISSN/ISBN: 0944-1344).
10. Solid-phase extraction of cerium(IV) with crosslinked poly(acrylic acid), coated on silica gel. Pranesh Chowdhury*, Susanta K. Pandit, and Bhabatosh Mandal*, Indian J. Chem. Sec. A, Vol. 47A, p1528-1532, 2008.
11. Extraction Chromatographic studies of cadmium (II) with SRS-100, a high molecular mass liquid carboxylic acid. B. Mandal*, Dipnarayan Dutta and U. S. Roy, J. Indian Chem. Soc., Vol. 85, pp 632-634, 2008.
12. Effect of sodium fluoride on germination, seedling growth, and biochemistry of Bengal gram (cicer arieninum), S Chakrabarti,^a PK Patra,^a B Mandal,^b D Mahatoa, Santiniketan, Fluoride, 45 (3 Pt 2), p 257–262, 2012.
13. Uptake of fluoride of two paddy (oryza sativa L.) varities treated with fluoride contaminated water, Sakuntala Chakraborty, Pulak kumar Patra, Bhabatosh Mandal, Paddy and Water Environ., DOI:10.1007/s10333012-0342-2,2012
14. Solid Phase Extraction, Preconcentration of Cu(II) and its Separation from Environmentally toxic metal ions with High Molecular Mass Liquid Cation Exchanger, Versatic 9. B. Mandal*, N. Ghosh and U. S. Roy; J. Indian Chem. Soc., Vol. 86, Dec'2009, page 1303-1314. (Impact factor: 0.382; ISSN/ISBN: 0019-4522).
15. Extraction Chromatographic studies of Bi(III) with SRS-100, a high molecular mass liquid carboxylic acid. B. Mandal*, Dipnarayan Dutta and U. S. Roy, Chem. Environ. Res., vol. 17(1&2), 75-81, 2008
16. Preparation and Characterization of Silanised Silica Gel-Supported Poly(acrylic acid) Network Polymer and Study of Its Analytical Application as Selective Extractor for Lead Ion. P. Chowdhury*, S. K. Pandit, and B. Mandal*, J. Appl. Poly. Sci., Vol. 110, p475-480, 2008.

17. Extraction Chromatographic Studies of uranium(VI) with crosslinked poly(acrylic acid) coated on silica gel. Bhabatosh Mandal*, Pranesh Chowdhury and Susanta K. Pandit, J. Indian Chem. Soc., Vol. 85, p930-935, 2008.
18. Extraction chromatographic method of preconcentration, estimation and concomitant separation of Vanadium (IV) with silica gel-Versatic 10 composite. Bhabatosh Mandal*, Milan K. Barman, Bhavya Srivastava and Chandan Ghosh. J Chrom Sci. 2014 Oct; 52(9):1135-44. doi: 10.1093/chromsci/bmt160.
19. Extraction Chromatographic Studies of Iron(III) with crosslinked poly(acrylic acid) coated on silica gel. P. Chowdhury, B. Mandal*, and S. K. Pandit, Chem. Environ. Res., vol. 17(3&4), p209-219, 2008.
20. Extraction Chromatographic studies of Al(III) with SRS-100, a high molecular mass liquid carboxylic acid. B. Mandal*, Dipnarayan Dutta and U. S. Roy, Chem. Environ. Res., Vol. 16(3&4), p215-228, 2007.
21. Solid-phase extraction of HgII ions with cross-linked poly(acrylic acid), coated on silanised silica gel. Pranesh Chowdhury*, Susanta K. Pandit, and Bhabatosh Mandal*, J. Indian Chem. Soc., Vol. 86, p377-382, 2009.
22. Separation of thorium(IV) on silica gel column crosslinked poly (acrylic acid), Bhabatosh Mandal*, Pranesh Chowdhury and Susanta K. Pandit, Chem. Environ. Res., Vol.17 (3&4), p266-274, 2008.
23. Extraction chromatographic method of preconcentration and separation of Dysprosium (III) with Versatic-10, a high molecular mass carboxylic Acid. B. Mondal*, Dip Narayan Datta and U.S. Roy; RJC, Vol. 2, p609-616, 2009
24. Extraction Chromatographic Method of Preconcentration and Separation of Fluoride with High Molecular Mass Liquid Anion Exchanger, Aliquat 336. B. Mandal*, P. K. Patra* and S. Chakraborty ; J. Indian Chem. Soc., vol. 86, november' 2009, p 1166-1172.

25. Extraction chromatographic method of thallium(III) with High Molecular Mass Carboxylic Acid (Versatic 10). B Mandal, U S Roy, Chem. Environ. Res.,10(1&2), p19-24, 2001.
26. Extraction chromatographic method of indium(III) with n-capric acid, B. Mandal, U. S. Roy, J. Indian Chem. Soc.,Vol. 78, 2001, p208-210.
27. Extraction chromatographic method of palladium(II) with SRS-100, a high molecular Mass carboxylic Acid . B Mandal, U S Roy, J. Indian Chem. Soc., Vol. 76, p304-305, 1999.
28. The electronegativity scale of Allred and Rochow: revisited;Dulal Chandra Ghosh, Tanmoy Chakraborty , Bhabatosh Mandal; Theoretica Chimica Acta, Vol. 124, p295-301, 2009.
29. Detection of Hg(II) amidst several heavy and toxic metal ions after their selective separation by chromatography: Rationalization of separation factors in terms of density-functional (Hardness) index. Bhavya Srivastava, Milan K Barman and Bhabatosh Mandal*, Desalination and Water Treatment, DWT, doi: 10.1080/ 19443994. 2013. 841101 (2013).
30. Solid-phase extraction, separation and preconcentration of titanium (IV) with SSG-V10 from some other toxic cations: a molecular interpretation supported by DFT. M. K. Barman, B. Srivastava, M. Chatterjee, B. Mandal, RSC Adv. 4 (2014) 33923-33934.
31. Characterization and Density Functional Theory Optimization of a Simultaneous Binder (FSG-XO) of Two Different Species Exploiting HOMO–LUMO Levels: Photoelectronic and Analytical Applications, Milan K. Barman, Mousumi Chatterjee, Bhavya Srivastava, and Bhabatosh Mandal*, Journal of Chemical & Engineering Data 06/2015
32. In vivo detection of fluoride at trace level and its removal from raw water at neutral pH utilizing cyanobacterium pigment as a luminescent probe, Mousumi Chatterjee, Chandan Ghosh, Milan K. Barman, Bhavya Srivastava, Dipika Roy and Bhabatosh Mandal*, RSC Advances, 2016, 6, 4410-4421.
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35. Bhavya Srivastava, Milan K. Barman, Mousumi Chatterjee and Bhabatosh Mandal; “EBT anchored SiO₂ 3-D microarray: a simultaneous entrapper of two different metal centers at high and low oxidation states using its highest occupied and lowest unoccupied molecular orbital, respectively” RSC Adv., 2015, 5, 55686–55703.
36. Mousumi Chatterjee, Bhavya Srivastava, Milan K. Barman, Bhabatosh Mandal* “Combined cation-exchange and solid phase extraction for the selective separation and preconcentration of zinc, copper, cadmium, mercury and cobalt among others using azo-dye functionalized resin” J. Chromatogr. A, 2016, 1440, 1–14.
37. Bhavya Srivastava, Milan K. Barman, Mousumi Chatterjee, Dipika Roy, Bhabatosh Mandal “Solid phase extraction, separation and preconcentration of rare elements thorium(IV), uranium(VI), zirconium(IV), cerium(IV) and chromium(III) amid several other foreign ions with eriochrome blackT anchored to 3-D networking silica gel” J. Chromatogr. A, 2016, 1451, 1–14.
38. Mousumi chatterjee, Bhavya Srivastava, Milan K. Barman, and Bhabatosh Mandal; “Facile Synthesis of a Luminescent Material, PAN@{SiO₂}_n, Having a Simultaneous Binding Capacity of High and Low Oxidation States: (HOMO/or LUMO), Quantum-mechanical Descriptor of Break-through Capacity” Analytical Sciences, 2016, 32, 989-998 © The Japan Society for Analytical Chemistry.
39. Bhabatosh Mandal, Dipika Roy, Mousumi Chatterjee, Rimi sarkar, Bhavya Srivastava, Siddhartha Banerjee, Sneha Mandal and Milan K. Barman, n-Capric-acid-anchored silanized silica gel; Its application to sample clean-up of Th(IV) sorbed as a dinuclear species in quantified H-bonded dimeric metal-trapping cores, NJC, 2017, 41, 5542-5554.
40. Dipika Roy, Rimi Sarkar, Bhavya Srivastava, Mousumi Chatterjee, Sneha Mandal , Siddhartha Banerjee, and Bhabatosh Mandal. “Ex cathedra immobilization of 8-

Hydroxyquinoline to inorganic carriers via a new silane coupling reagent for extractive sample clean up of Fe(III)” J. Chem. Eng. data., 2017, 62 (10), 3284-3296.

41. Mousumi Chatterjee, Dipika Roy, Sneha Mandal, Rimi Sarkar, Susanta Malik, Milan K. Barman, Bhavya Srivastava and Bhabatosh Mandal. “Detection and selective sample clean-up of beryllium(II) through {extractor-HOMO} (:) {Be₃O(OH)₂}²⁺ ‘ion pair complexation’ amidst aluminum(III) and uranium(VI) by employing a fluorescent resin: the resin’s HOMO Amount is a quantitative descriptor of BTC.” NJC, 2018, 42, 9410-9423, DOI: 10.1039/c8nj01301b.

42. Bhavya Srivastava, Dipika Roy, Rimi Sarkar, Sneha Mandal , Mousumi Chatterjee, Siddhartha Banerjee, and Bhabatosh Mandal, Fluorescent Resin-Assisted Extraction for Selective Separation and Preconcentration of Mercury(II) and its onlineDetection, J. Chem. Eng. data., 2017, 62 (8), 2350-2361.

43. Sneha Mondal, Susanta Malik, Rimi Sarkar, Dipika Roy, Sanchari Saha, Shailja Mishra, Anindya Sarkar, Mousumi Chatterjee, and Bhabatosh Mandal*. Exuberant Immobilization of Urease on an Inorganic SiO₂ Support Enhances the Enzymatic Activities by 3-fold for Perennial Utilization, Bioconjugate Chem. 2019, 30, 134–147.

44. Rimi Sarkar, Dipika Roy, Sneha Mondal, Susanta Malik, Anindya Sarkar, Sanchari Saha, Shailja Mishra, Mousumi Chatterjee, Bhabatosh Mandal*. Dithizone enriched silica gel surface, {SiO₂}@DZ obtained in a single step for selective sample clean up of Cd(II) from its congeners employing ion pair. Journal of Environmental Chemical Engineering 7 (2019) 102864.

45. Sneha Mondal, Sanchari Saha, Shailja Mishra, Rimi Sarkar, Dipika Roy, Bhabatosh Mandal* ‘Urease immobilized single-kit’ for sensing of thiourea-glucose pair employing fluorescence ‘turn off - turn on’ and as an efficient sorbent for selective sample cleanup of thiourea. Anal. Chim. Acta, 1141 (2021) 180-193.