Dr. Subhankar Basu

Dr. Subhankar Basu,M. Tech., Ph.D.
Assistant Professor
Department of Applied Sciences
National Institute of Advanced Manufacturing Technology
Ranchi - 834003
E-mail: subhankarb@nifft.ac.in; basusubhankar4@gmail.com
Phone: +91-9818878551

I have completed my doctoral degree in Engineering from Katholieke Universiteit Leuven (KUL), Belgium, PG degree in Environmental Engineering & Management from IIT Kanpur and UG from Jadavpur University, Calcutta. I have a working experience of more than 16 years in Industry (Ballarpur Industries Ltd. Thapar Group), Research Organization (The Energy and Resources Institute, New Delhi) and Teaching institute (NIFFT). I am a recipient of MIP funding, Govt. of Belgium and Scholarships from Govt. of India. I started my research career with the development of mixed matrix membranes involving distribution of nanomaterials in suitable polymer matrix for the application of mixed gas separations and solvent resistant nanofiltration with Prof. Ivo Vankelecom, K U Leuven. Over the period I have successfully prepared different polymeric and ceramic membranes for the treatment of wastewater and developed different treatment schemes for the treatment of wastewater, along with Dr. Malini Balakrishnan, TERI. I have also worked on resource recovery from different waste streams and prepare value-added porous materials from chemical wastes generated during the treatment processes. I was associated with the installation of pilot plant membrane bioreactor with indigenously developed ceramic membranes at TERI, Gual Pahari, Gurgaon. I have also worked extensively in training and best practices of E-waste generation, quantification and recycle-reuse in different parts of the country.

Publications

Journals:

R. Lakra, M. Balakrishnan, S. Basu, *Development of cellulose acetate-chitosan-metal organic framework forward osmosis membrane for recovery of water and nutrients from wastewater*, Journal of Environmental Chemical Engineering 9 (2021) 105882.

R. Lakra, M. Balakrishnan, S. Basu, *Activated Carbon Incorporation on Forward Osmosis Membrane Surface for Enhanced Performance*, Water Science and Technology-Water Supply (in Press).

U. Sharma, S. Shalini, S. Basu, P. Saravanan, M. Jang, *Active layer modification of commercial Nanofiltration membrane using CuBTC/PVA matrix for improved surface and separation characteristics*, J Applied Polymer Science, 138 (21) (2021) 1-12

N. Singh, S. Basu*, M. Balakrishnan *Comprehensive treatment scheme for distillery wastewater targeting recovery of water, antioxidant compounds and biogas,*J Water Process

Engineering, 38 (2020), 101663

N. Singh, I. Petrini, C. Hélix-Nielsen, S. Basu*, M Balakrishnan, *Influence of Forward Osmosis (FO) membrane properties on dewatering of molasses distillery wastewater,* J Water Process Engineering, 32 (2019), 100921 (SCI)

N. Singh, S. Dhiman, S. Basu*, M. Balakrishnan, I. Petrinic, C. Helix-Nielsen, *Dewatering of sewage for nutrients and water recovery by Forward Osmosis (FO) using divalent draw solution,* Water Process Engineering, 31 (2019), 100853 (SCI)

Kaushik, A.; Basu*, S.; Batra, V. S.; Balakrishnan, M. *Fractionation of sugarcane molasses distillery wastewater and evaluation of antioxidant and antimicrobial characteristics*, Ind Crops Prod. 118 (2018)73 (SCI)

N. Singh, I. Petrinic, C. Hélix-Nielsen, S. Basu*, M. Balakrishnan, *Concentrating molasses distillery wastewater using biomimetic forward osmosis (FO) membranes*, Water Research, 2018, 130, 271 (SCI).

Basu*, S.; Mukherjee, S.; Balakrishnan, M.; Deepthi, M.; Sailaja,V. R. R. N. *Polysulfone/ nanocomposites mixed matrix ultrafiltration membrane for the recovery of Maillard reaction products*. Membr. Water Treat., 2018, 9 (2), 105 (SCI).

Kaushik A., Basu S. *, Raturi S., V.S. Batra, M. Balakrishnan, *Recovery of antioxidants from sugarcane molasses distillery wastewater and its effect on biomethanation*, J Water Process Engg., 2018, 25, 205 (SCI)

Kaushik, A.; Basu*, S., Singh, K.; Batra, V. S.; Balakrishnan, M. *Activated carbon from sugarcane bagasse ash for melanoidins recovery.* J Environ. Manage, 2017, 200, 29 (SCI).

Basu*, S.; Balakrishnan, M.*Polyamide thin film composite membranes containing ZIF-8 for the separation of pharmaceutical compounds from aqueous streams*. Sep. Purif. Technol., 2017, 179, 118 (SCI).

Korenak, J.; Basu, S.; Balakrishnan, M.; Hélix-Nielsen, C.; Petrinic, I. *Forward osmosis in wastewater treatment processes.*Acta Chim. Slov. 2017, 64, 83 (SCI).

Basu*, S.; Kaushik, A.; Saranya, P.; Batra,V. S.; Balakrishnan M., *High strength distillery wastewater treatment by a PAC-MBR with low PAC dosage*, Water Sci. Technol., 2016, 73, 1104 (SCI).

Mehta, N., Basu*, S., Kumar, A. *Separation of zinc oxide nanoparticles in water stream by membrane filtration,* J Water Reuse Desal, 06, 2016, 148 (SCI).

Singh, N.; Basu*, S.; Vankelecom, I.; Balakrishnan, M. *Covalently immobilized laccase for decolourization of glucose-glycine Maillard products as colourant of distillery wastewater*, App. Biochem. Biotechnol., 2015, 177, 76 (SCI).

Basu*, S.; Mukherjee, S; Kaushik, A; Batra,V. S.; Balakrishnan, M. *Integrated treatment of molasses distillery wastewater using microfiltration (MF)*, J Environ. Manage., 2015,158, 55 (SCI).

Basu*, S.; Singh, S. K; Tewari, P.K; Batra, V. S, Balakrishnan, M. *Treatment of nitrate-rich water in a baffled membrane bioreactor (BMBR) employing waste derived materials*, J Environ. Manage, 2014,146, 16. (SCI).

Basu, S.; Maes, M.; Cano-Odena, A.; Alaerts, L.; DeVos, D. E.; Vankelecom, I. *Solvent resistant nanofiltration (SRNF) membranes based on metal-organic frameworks*, J Membr. Sci., 2009, 344, 190 (SCI).

Basu, S.; Khan, A. L.; Cano-Odena, A.; Liu, C.; Vankelecom, I. *Membrane-based technologies for biogas separations*, Chem. Soc. Rev., 2010 39, 750 (SCI).

Basu, S.; Cano-Odena, A.; Vankelecom, I. *Asymmetric Matrimid®/[$Cu_3(BTC)_2$] mixed-matrix membranes for gas separations*, J Membr. Sci., 2010, 362, 478 (SCI).

Basu, S.; Cano-Odena, A.; Vankelecom, I. *Asymmetric membrane based on Matrimid® and polysulphone blends for enhanced permeance and stability in binary gas (CO_2/CH_4) mixture separations,* Sep. Purif. Technol., 75, 2010, 15 (SCI).

Basu, S.; Cano-Odena, A.; Vankelecom, I. *MOF-containing mixed-matrix membranes for CO_2/CH_4 and CO_2/N_2 binary gas mixture separations*, Sep. Purif. Technol., 81, 2011, 31 (SCI).

Khan, A.L.; Basu, S.; Cano-Odena, A.; Vankelecom, I. *Novel high throughput equipment for membrane based gas separations*, J Membr. Sci., 354, 2010, 32 (SCI).

Pinelli, D.; Bacca, A.E. M.; Kaushik, A.; Basu, S.; Nocentini, M.; Bertin, L.; Frascari, D.; *Batch and continuous flow adsorption of phenolic compounds from olive mill wastewater: A comparison between nonionic and ion exchange resins.*Int. J Chem. Engg., 2016, 2016, Article ID 9349627, 1 (Scopus indexed).

Chowdhury, P.; Basu*, S.; Tewari, P. K.; Batra, V. S.; Balakrishnan, M. *Formation and characterization of aerobic granules in a lab-scale activated sludge system treating sewage*, Int. J Environ. Waste Manage., 2015,16(1), 38 (Scopus indexed).

Basu*, S.; Verma, S.; Singh, R.K.; Batra,V.S; Balakrishnan, M. *Biological nitrate removal using waste-derived extracts as sole carbon source.* Int. J. Environ.Waste Manage., 2014, 14, 276 (Scopus indexed).

Tare, V.; Basu* S., *Prolong restoration of the water quality of the river Ganga: Effect of heavy metals and radioactive elements,* J Environ. Sci. Engg., 2014, 56 (2), 137 (Scopus indexed).

Basu*, S.; Singh, R. K.; Rajeshwari, K. V.; Johri, R.; Ghosh A. M.; *Environmental degradation and health impacts in E-waste recycling industrial area, Delhi,* Journal of Ind. Ass. Environ. Manage., 2007, 6, 30 (Scopus indexed).

E. Gidarakos; E. Dimitrakakis, S. Basu, K V Rajeshwari, R. Johri, *E-Waste recycling environmental contamination: Mandoli, India*, Waste & Res Manage. ICE Institute of Civil Engineers Proceedings 165, (2011) 45 (UGC approved).

A.Kaushik, S. Basu*, R. K. Singh, V. S Batra, M. Balakrishnan, *Phenol removal from water with modified carbons prepared from bagasse ash*, e-Planet, 10, 2013, 1-6.

A. Dubey, S. Basu*, P. K Tewari, R. K Singh, V S Batra, M Balakrishnan, *Sewage treatment in a bioreactorwith indigenous membranes*, e-Planet, 11 (1), 2013, 1-5.

A. Nambiar, K. Doriya, P. Choudhry, S.Basu*, P. K Tewari, R. K Singh, V. S Batra, M. Balakrishnan, *Biological powdered activated carbon membrane bioreactor (BPAC-MBR) for treatment of industrial wastewater*, e-planet, 11(2), 2013, 6-11.

N. Mehta, S. Basu, A. Kumar, *Incorporating Benefits of Nanomaterials in MembraneFiltration Process for Producing Safe Drinking Water*, Environmental Sustainability: Concepts, Principles, Evidences and Innovations - ISBN: 978-93-83083-75-6.

Conference Proceedings:

S. No.	Author (s)	Title of Paper	Name of the Conference	Place & Date
1	S. Basu, P. K. Tiwari, R. K. Singh, Vidya S Batra, M.Balakrishnan	Pilot-Plant Study of Membrane Bioreactor (MBR) with Biomass Ash Filters for Sewage Treatment	2nd National Conference on Sustainable Advanced Technologies for Environmental Management (SATEM-2019)	IIEST Sibpur, Dec 18 -20, 2019
2	K. Suraj, A. Kumar , A. Nair, S. Basu	Prediction of ambient particulate matter concentrations in and around open cast coal mine using AERMOD	2nd National Conference on Sustainable Advanced Technologies for Environmental Management (SATEM-2019)	IIEST Sibpur, Dec 18 - 20, 2019
3	J. Ghosh and S. Basu	Modification of Biomass ash based filters for sewage tretament	The 6th IWA Regional Membrane Technology Conference-IWA 2018	M. S. University, Baroda 10-12 Dec 2018
4	N. Singh, S. Basu, M. Balakrishnan	Laccase immobilized on acetone silanized alumina supports for industrial wastewater treatment.	6th International Conference on Ecotoxicology & Environmental Sciences (ICEES-2018)	19-21 Feb, 2018, Netaji Subhas Inst.Technol., Delhi
5	N. Singh, S. Basu, I. Petrinic, C. Helix-Nielsen, M. Balakrishnan	Melanoidins up-concentration using biomimetic forward osmosis (FO) membrane	International Conference on Water Resource Management	11-12 Jan 2018, CSIR-CGCRI, Kolkata
6	S. Basu (Invited Talk)	Nanomaterials for Environmental Applications	Two day Workshop on Recently Developed Materials (RDM-2018)	23-24Feb, 2018, B.A. College of Engg. Technol., Jamshedpur
7	S Mourya, S. Basu*, M Balakrishnan,	Ceramic membrane filtration of sewage: resource recovery and reuse	National Conference On Environmental Issues, Challenges And Solutions (EICS-2016),	February 23-24, 2017, NIFFT, Ranchi
8	N. Singh, S.Dhiman, S. Basu*,I. Petrinic, C. Helix-Nielsen, M. Balakrishnan	Sewage up-concentration using biomimetic forward osmosis (FO) membrane	IV. Soós Ernő International Scientific Conference , Water and Wastewater Treatment in the Industry 2017	19 Oct 2017, University of Pannonia, Hungry
9	N. Singh, S. Basu , M. Balakrishnan , J.	Concentrating melanoidins and cleaning of aquaporin	2017 International Congress on Membranes and membrane	July 29-August 4, 2017, San Fransisco, CA, USA

	Korenak, I. Petrinic, C Helix-Nielsen,	hollow fiber forward osmosis membrane	Processes (ICOM)	
10	S Basu, M Balakrishnan	Mixed matrix membrane for removal of pharmaceutical compounds	International Conference On Innovations in Sustainable Water and Wastewater Treatment Systems (ISWATS)	NEERI Nagpur, April 21-23, 2016, Pune
11	S Basu, P K Tiwari, R K Singh, V S Batra, M Balakrishnan	Pilot membrane bioreactor (MBR) for sewage treatment	International Conference On Innovations in Sustainable Water and Wastewater Treatment Systems (ISWATS)	April 21-23, 2016, Pune
12	A. Kaushik, S. Basu, V.S. Batra, M. Balakrishnan, D. Frascari, D. Pinelli	Polyphenols recovery from distillery wastewater using resins	International Conference On Innovations in Sustainable Water and Wastewater Treatment Systems (ISWATS)	April 21-23, 2016, Pune
13	A. Kaushik, K. Singh, S. Basu, V.S. Batra, M. Balakrishnan	Adsorptive Recovery of Melanoidins	International Conference On Innovations in Sustainable Water and Wastewater Treatment Systems (ISWATS)	April 21-23, 2016, Pune
14	N. Singh, S. Basu, M. Balakrishnan, J. Korenak, I. Petrinic, C Helix-Nielsen	Atrazine removal by forward osmosisusing biomimetic membrane	International Conference On Innovations in Sustainable Water and Wastewater Treatment Systems (ISWATS)	April 21-23, 2016, Pune
15	B.Aumeier, A. Preiss, S.Basu, M.Balakrishnan, S. Yüce, M. Wessling	Characterization and modification of ceramic membranes made from sugarcane recycling material aiming for low-cost water treatment	Euromembrane conference	RWTH Aachen, Germany, 6-10 September 2015
16	N. Singh, S. Basu, M. Balakrishnan	Superparamagnetic biocatalytic membrane bioreactors for treatment of recalcitrant compounds	International Conference on Membrane Based Separations, MEMSEP 2015	M S University of Baroda, Vadodara, Gujarat, 21-23 March 2015
17	S. Basu, M. Balakrishnan	Metal organic framework (MOF) based thin film composite membranes for removal of pharmaceutical compounds	International Conference on Membrane Based Separations, MEMSEP 2015	M S University of Baroda, Vadodara, Gujarat, 21-23 March 2015
18	N. Singh, S. Basu, M. Balakrishnan	Lignin degradation with immobilized enzyme	International Congress Environmental Research	Bangalore, India Dec 26-28, 2014
19	S. Basu	Treatment of industrial wastewater containing recalcitrant compounds	International Forward Osmosis Workshop	Tarragona, Spain, Dec 11-12, 2014
20	N. Mehta, S.Basu, A. Kumar	Incorporating benefits of nanomaterials in membrane filtration process for producing safe drinking water	International Congress on "Agriculture, Food Engineering and Environmental Sciences-Sustainable Approaches" (AFESSA-2014)	New Delhi, India, March 29-30, 2014
21	P. Chowdhry, S. Basu*, P. K. Tewari, V.S. Batra, M. Balakrishnan	Treatment of distillery effluent in powdered activated carbon (PAC supplemented membrane bioreactor (MBR): Effect of PAC properties on system performance	Int. conf. Bio energy, Environment, Sustainable Technologies (ICBEST)	Tamil Nadu, Jan 2013
22	Y. Satyawali, S.	Advances in improving	Int. conf. Bio energy,	Tamil Nadu, Jan 2013

	Basu, V. S. Batra, M. Balakrishnan*	energy efficiency in membrane bioreactor (MBR) operation	Environment, Sustainable Technologies (ICBEST),	
23	S. Verma, A. Kaushik, S. Basu*, P.K. Tewari, V.S. Batra, M. Balakrishnan	Biological nitrate removal using food waste leachate as carbon source: comparison of membrane bioreactor configurations	Int. conf. Bio energy, Environment, Sustainable Technologies (ICBEST),	Tamil Nadu, Jan 2013
24	S. Basu*, P. K. Tiwari, R. K. Singh, V. S Batra, M. Balakrishnan	Membrane Technology for Water and Wastewater Treatment: Opportunities and Challenges for Developing Countries	VI World Aqua Congress	New Delhi, Nov 2012
25	S. Basu*, P. K. Tewari, R. K. Singh, V. S. Batra, M. Balakrishnan	Wastewater treatment using separation media derived from industrial solid waste	3rd GEM-IIT Research Seminar on Recent advances and innovations for sustainable water management	New Delhi, Dec 2012
26	E.Gidarakos, S. Basu, K. V. Rajeshwari, E. Dimitrakakis, R. Johri	E-waste recycling environmental contamination: Mandoli, India	ICE – Waste and Resource Management, ISSN : 1747-6526, 165 (1) 45-52	Athens, Greece, 2012
27	S.Basu	Hybrid membranes for biogas separation	Int. Conf. Membranes: Environmental Biological Applications	Kerala,2011
28	S. Basu, M. Maes, A. Cano-Odena, L. Alaerts, D. E. De Vos, I. F.J. Vankelecom	Solvent resistant nanofiltration (SRNF) membranes based on metal-organic frameworks	Euromembrane Conference	Montpellier- France, 2009
29	S. Basu, A. Cano-Odena, I. F.J. Vankelecom	Comparative study of asymmetric MOF based mixed-matrix membranes for gas separations	North American Membrane Society Conference	Washington D.C-USA, 2010
30	S. Basu, A. Cano-Odena, I. F.J. Vankelecom	MOF-containing mixed-matrix membranes for CO_2/CH_4 and CO_2/N_2 binary gas mixture separations	Int. Congress Membranes Processes (ICOM)	Amsterdam, The Netherlands,2011
31	E. Dimitrakakis, E. Gidarakos , S. Basu , K. V. Rajeshwari, R. Johri, B. Bilitewski, M. Schirmer	Creation of optimum knowledge bank on E-Waste management in India	International Solid Waste Association Congress	Copenhagen, Denmark, 2006
32	R. Johri, K. V. Rajeshwari, R K. Singh, S. Basu	Electronic waste in India with a special focus on recycling in Delhi Capital Region	Protection and restoration of the environment VIII	Crete, Greece, 2006
33	M. Balakrishnan, S. Basu, P. K. Tiwari, R. K. Singh, V. S Batra	Sewage reclamation in an indigenous MBR	Recent advances in biodegradation of human wastes (SaniCon 2014)	Tezpur, Assam, 16-17 Dec 2014

Book chapters:

S. No.	Author(s)	Book Title	Publisher with Address	Year of Publication	Pages
1	Ekta Tayal, Akash M Chandran, S. Varun, Reshma Lakra, Prasanna Kumar S. Mural, Subhankar Basu	Bio-membrane Filtration in Industrial Wastewater Treatment - Innovative Approaches	Springer	Under review Chapter contribution	
2	Subhankar Basu and Asim L Khan	Novel CO_2 capture technologies	Taylor and Francis, CRC	Under review Chapter contribution	
3	R. Johri, S. Basu	Water audit and conservation, Handbook on energy audit and environmental management	TERI Press, New Delhi	2006 Chapter 17	225-235
4	S. Basu	E-waste: Implications, regulations, and management in India and current global best practices	TERI Press, New Delhi	2008 Chapter 3	45-68

Projects

Sl. No	Sponsoring Agency	Title of Project	Grant Amount (INR) Lakhs	Period (months)	PI/CO-PI
1.	DST	Solar Driven Community Potable Water Purification System (Ongoing 2020 onwards)	72.09	36	Co-PI
2.	DST	Chitosan based thin active layer forward osmosis (FO) membrane for sewage up-concentration and resource recovery (ongoing 2019 onwards)	21	36	PI
3	DST	Polyimide thin film composite membranes containing MOFs for separation of pharmaceutical products from aqueous streams (Completed)	17	36	PI
4	DST	Biomimetic forward osmosis membranes for wastewater treatment (Completed)	12	36	Co-PI
5	EU-DST	Enzyme supplemented membrane bioreactor (EnMBR) for degradation of recalcitrant compounds in industrial wastewater (completed)	25	24	Co-PI
6	DBT	Organics & color reduction of distillery wastewater in a biological powdered activated carbon membrane bioreactor (BPAC-MBR) using biomass ash filters (Completed)	23	36	Co-PI
7	Ministry of Rural Development	Nitrate removal in membrane bioreactors using indigenous membranes (Completed)	16	24	Co-PI
8	DST	Development of indigenous membrane bioreactors (MBRs) using submerged fly ash membranes and its application for municipal wastewater treatment (Completed)	36	36	Co-PI
9	The Patel College of Global Sustainability (PCGS), USA	Portable drinking water purification system (Completed)	4	6	Co-PI
10	International Foundation for Science (IFS)	Surfactant removal potential of a filtration bioreactor equipped with a non-woven mesh as a filter material (Completed)	5.4	36	PI

	Sweden				
11	European Union	Creation of optimum knowledge bank for efficient E-waste management (Completed)	641	30	Co-PI
12	Ministry of Environment and Forest	Training programme on creation of awareness and knowledge on e-waste management (Completed)	5.3	3	Co-PI
13	The Meridian Institute, India	Independent Third Party Water Assessment of Coca Cola Plants in India (Completed)	100	24	Team member
14	Sona Koya Steering Systems Ltd. Gurgaon	Water audit in Sona-Koya steering Systems Ltd. Gurgaon	3	6	PI
15	Veolia Water Technologies	GSK Sonepat Industrial Wastewater Treatment Plant's Analysis	1.5	6	PI

Teaching Interests

Water Supply and Treatment
Wastewater Engineering
Solid and Hazardous Waste Management
Environmental Chemistry
Environmental Pollution Control

Research Interests

The demand for fresh water has increased many folds over the last few decades because of rapid urbanization, agriculture and industrialization. To meet the demand many stringent regulations e.g. zero liquid discharge, resources recovery etc are being encouraged by the Government. Funding for research is also available. This has motivated me to concentrate on development of effective and economical technologies. Membrane technology is one such up-coming technology. My current research interest involves development of Forward Osmosis membranes for concentrating different waste streams and suitable UF-NF membranes for removal of contaminants from natural sources.