

## Bhaskar Bhaduri

**Current address:** Department of Chemical Engineering,  
Indian Institute of Technology, Kharagpur

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### EDUCATION

- Ph.D., 2015, Indian Institute of Technology Kanpur, India (Chemical Engineering), CPI: 9.33/10, Rank:1  
Thesis Title: “Transition metal nanoparticles-grown carbon nanofibers containing porous carbon microfibers and spherical carbon beads for catalytic reaction applications” (Advisor: Prof. Nishith Verma)
- M.E., 2010, Jadavpur University, India (Chemical Engineering), CPI: 9.22/10, Rank:2  
Thesis Title: “Studies on simultaneous adsorption and reaction of hexavalent chromium on a composite fixed bed” (Advisor: Prof. Ujjaini Sarkar)
- B.Tech., 2007, West Bengal University of Technology, India (Chemical Engineering), DGPA:8.36/10

### WORK EXPERIENCE

- Assistant Professor Grade I, Indian Institute of Technology, Kharagpur, Department of Chemical Engineering (May 30, 2019-present)
- Postdoctoral fellow, The Hebrew University of Jerusalem, Israel, Department of Soil and Water Sciences (December 2016-May 2019), Host: Prof. Benny Chefetz
- Postdoctoral fellow, Weizmann Institute of Science, Israel, Department of Environmental Sciences (April 2015-September 2016), Host: Prof. Yinon Rudich

### COURSES TAUGHT

- Process Equipment Design and Drawing (Autumn, 2019)

- Reaction Engineering Lab (Autumn, 2019)
- Computer Aided Process Engineering Lab (Autumn, 2019)

### **THESIS/PROJECT SUPERVISION (BTP MTP, and Ph.D. THESES)**

- BTP Project (1 completed)
- MTP Project: (2 completed as a CO-PI)
- Ph.D. Thesis (1 ongoing)

### **RESEARCH INTERESTS**

- Synthesis and characterization of inorganic and organic nanostructures
- Heterogeneous catalysis, adsorption, abatement of air and water pollution
- Microbial fuel cells, super capacitors
- CO<sub>2</sub> capture
- Aerosol chemistry, ice nucleation
- Properties of humic-like substances
- Organic coating, humic acid–nanoparticles interaction

### **FACILITIES ESTABLISHED**

- Experimental set-up for the catalytic reduction of nitric oxide (NO<sub>x</sub>)
- Ice-nucleation experimental set-up

### **AWARDS AND ACHIEVEMENTS**

- International travel grant - BARD (United States-Israel Bi-national Agricultural Research and Development), April, 2018
- Golda Meir prime ministerial merit fellowship funded by Lady Davis fellowship trust - The Hebrew University of Jerusalem, (October, 2017-present)
- BARD (United States-Israel Bi-national Agricultural Research and Development) post-doctoral research fellowship - The Hebrew University of Jerusalem, (December, 2016 - present)
- Feinberg Graduate School travel grant, May 2016

- Feinberg Graduate School postdoctoral fellowship - Weizmann Institute of Science, (April, 2015 to September, 2016)
- Merit scholarship (FRQNT scholarship) for performing postdoctoral research - University of Quebec at Chicoutimi, Canada, 2015 (declined)
- International travel grant - CICS, (Govt. of India), March, 2015
- International travel grant - CSIR, (Govt. of India), March, 2015
- International travel grant – DRPG (IIT Kanpur), March, 2015
- International travel grant - DST, (Govt. of India), August, 2014
- International travel grant –DRPG (IIT Kanpur), August, 2014
- Cash awards for publishing articles in International Journals-IIT Kanpur, 2014
- Ph.D. fellowship - MHRD, (Govt. of India), (August, 2010-March, 2015)
- Merit scholarship for M.Tech study - UGC (Govt. of India) (August, 2008- June, 2010)

## **SKILLS**

**Materials Development:** 7+ years of experiences in developing novel inorganic-organic nanostructured catalysts

**Materials Characterization:** Skilled in many characterization techniques, namely, Atomic absorption spectroscope (AAS), Fourier transform infra-red spectroscope (FT-IR), BET instrument (*included multi point BET, TPR, Chemisorption, TPD*), C-H-N-S-O analyzer, Gas chromatograph, Scanning Electron microscope (SEM), UV- visible spectroscope, High level NO<sub>x</sub> analyzer, CVD reactor, Impregnation unit, Particle size analyzer, Plasma cleaner, Ice nucleation cell, TGA analyzer, DSC, Raman spectroscope, Zeta Sizer (both DLS and Zeta potential measurement), Total organic carbon (TOC) content analyzer

**Abatement of air and water pollution:** More than 8 years of experiences in the removal of different air and water pollutants by catalytic reactions (oxidation and reduction) and adsorption

## **PEER REVIEW:**

Reviewer: Journal of Materials Science, Water Research, Environmental Science & Technology, Journal of Environmental Chemical Engineering, Science of the Total Environment, Journal of Water Process Engineering, Catalysis Today, Colloid and Surfaces A.

## JOURNAL PUBLICATIONS

- **Bhaduri, B.**, Polubesova, T. Facile synthesis of carbon-supported silver nanoparticles as an efficient reduction catalyst for aqueous 2-methyl-p-nitrophenol, *Materials Letters* 267 (2020) 127546.
- **Bhaduri, B.**, Polubesova, T., Chefetz, B. Interactions of organic dye with Ag-Ag<sub>2</sub>S and CeO<sub>2</sub> nano-assemblies in the aqueous medium: Role of dissolved organic matter, *Colloids and Surfaces A: Physicochemical and Engineering Aspects* 577 (2019) 683-694.
- Hiranuma, N., Adachi, K., Bell, D., Belosi, F., Beydoun, H., **Bhaduri, B.**, Bingemer, H., Budke, C., Clemen, H.-C., Conen, F., Cory, K., Curtius, J., DeMott, P., Eppers, O., Grawe, S., Hartmann, S., Hoffmann, N., Höhler, K., Jantsch, E., Kiselev, A., Koop, T., Kulkarni, G., Mayer, A., Murakami, M., Murray, B., Nicosia, A., Petters, M., Piazza, M., Polen, M., Reicher, N., Rudich, Y., Saito, A., Santachiara, G., Schiebel, T., Schill, G., Schneider, J., Segev, L., Stopelli, E., Sullivan, R., Suski, K., Szakáll, M., Tajiri, T., Taylor, H., Tobo, Y., Weber, D., Wex, H., Whale, T., Whiteside, C., Yamashita, K., Zelenyuk, A., and Möhler, O.: A comprehensive characterization of ice nucleation by three different types of cellulose particles immersed in water: lessons learned and future research directions. *Atmospheric Chemistry & Physics*, <https://doi.org/10.5194/acp-2018-933> 19 (7) (2019) 4823-4849.
- **Bhaduri, B.**, Engel, M., Polubesova, T., Wu, W., Xing, B., Chefetz, B. Dual functionality of an Ag-Fe<sub>3</sub>O<sub>4</sub>-carbon nanotube composite material: Catalytic reduction and antibacterial activity. *Journal of Environmental Chemical Engineering* 6(4) (2018) 4103-4113.
- Lavi, A., Lin, P., **Bhaduri, B.**, Carmeili, R., Laskin, A., Rudich, Y. Characterization of light absorbing oligomers from the reaction of lignin pyrolysis products and Fe(III). *ACS Earth and Space Chemistry* 1(10) (2017) 637-646.
- Banerjee, A., Mahato, N., **Bhaduri, B.\***, Balaji, N., Siddiqui, A. R., Aruna, S.T., Verma, N., Balani, K. Catalytic effects of CeO<sub>2</sub> and carbon nanotubes on phase evolution of plasma sprayed Al<sub>2</sub>O<sub>3</sub>. *Nanomaterials and Energy* 6 (2017) 1-20. (\*-joint first author)
- Prajapati, Y. N., **Bhaduri, B.**, Joshi, H. C., Srivastava, A., Verma, N. Aqueous phase adsorption of different sized molecules on activated carbon fibers: Effect of textural properties. *Chemosphere* 155 (2016) 62-69.

- **Bhaduri, B.**, Verma, N. Carbon bead-supported nitrogen-enriched and Cu-doped carbon nanofibers for the abatement of NO emissions by reduction. *Journal of Colloid and Interface Science* **457** (2015) 62-71.
- **Bhaduri, B.**, Verma, N. Removal of CO by Water Gas Shift Reaction over Bimetal CeO<sub>2</sub> and Ni Nanoparticles Dispersed in Carbon Micro-nanofibers. *Catalysis Letters* **145** (6) (2015) 1262-1271.
- Modi, A., **Bhaduri, B.**, Verma, N. Facile one-step synthesis of nitrogen doped carbon nanofibers for the removal of potentially toxic metals from water. *Industrial and Engineering Chemistry Research* **54** (18) (2015) 5172-5178.
- **Bhaduri, B.**, Verma, N. Preparation of asymmetrically distributed bimetal CeO<sub>2</sub> and Cu NPs in nitrogen-doped ACF/CNF for the removal of NO by reduction. *Journal of Colloid and Interface Science* **436** (2014) 218-226.
- Talukdar, P., **Bhaduri, B.**, Verma, N. Catalytic oxidation of NO over ACF-CNF-supported CeO<sub>2</sub> and Cu nanoparticles at room temperature. *Industrial and Engineering Chemistry Research* **53** (31) (2014) 12537-12547.
- **Bhaduri, B.**, Verma, N. Zn nanoparticles dispersed activated carbon micro fibers and carbon nano fibers for the H<sub>2</sub> production step of ZnO/Zn water splitting thermochemical cycle. *Chemical Engineering Research and Design Journal* **96**(6) (2014) 1079-1090.
- **Bhaduri, B.**, Prajapati, Y.N., Sharma, A., Verma, N. CuCl<sub>2</sub> nanoparticles dispersed activated carbon microfibers for the oxygen production step of Cu-Cl thermochemical water splitting cycle. *Industrial and Engineering Chemistry Research* **51** (48) (2012) 15633- 15641.
- Bikshapathi, M., Singh, S., **Bhaduri, B.**, Mathur, G.M., Sharma, A., Verma, N. Fe-nanoparticles dispersed carbon micro and nanofibers: Surfactant-mediated preparation and application to the removal of gaseous VOCs. *Colloids and Surfaces A: Physicochemical and Engineering Aspects* **399** (2012) 46– 55.
- Singh, S., **Bhaduri, B.**, Banerjee, P.K., Datta, S. Assessment of coastal water quality at Bakkhali, West Bengal, India. *Journal of Environmental Science & Engineering* **54**(2) (2012) 217-226.
- Singha, S., Sarkar, U., Dutta, S., **Bhaduri, B.** Batch equilibrium analysis for the removal of hexavalent chromium: Analysis of uncertainties using numerical modeling.

Desalination and Water Treatment **48 (1-3) (2012) 70-81.**

### **INVITED TALKS**

- Novel Cu nanoparticles grown carbon nanofibers supported on graphitic carbon nitride for adsorption application, International Conference on Functional Materials, Indian Institute of Technology Kharagpur, West Bengal, India (January 08, 2020)
- Nanoparticles in water treatment, Madan Mohan Malaviya University of Technology, Gorakhpur, UP, India (August 09, 2019)
- Metal nanoparticle-doped carbon-based nanostructured materials for air and water pollution control, Indian Institute of Technology, Patna, India (October 08, 2018)

### **QIP SPONSORED COURSE ATTENDED**

- Electrochemical Energy Generation and Storage Materials, Indian Institute of Technology Kanpur (November 14-18, 2019)

### **LIST OF CONFERENCE PUBLICATIONS/ PRESENTATIONS**

- **Bhaskar Bhaduri**, November 4-6, 2019. Indo-Australian Workshop on Integrated Urban Water Management Systems. **Indian Institute of Technology Kharagpur, India.**
- **Bhaskar Bhaduri**, Maya Engel, Tamara Polubesova, Benny Chefetz, March 14, 2019. Silver nanoparticles decorated magnetic carbon nanostructures for catalytic reaction and antibacterial applications. EPSCON 2019, The David Lopatie Conference Centre, **Weizmann Institute of Science, Israel.**
- **Bhaskar Bhaduri**, February 26, 2019. Safe use of treated wastewater for crop irrigation: Understanding risks of pollutants of emerging concern (STREAM workshop: Joint Israel-UK workshop), **The Hebrew University of Jerusalem, Israel.**
- **Bhaskar Bhaduri**, Maya Engel, Tamara Polubesova, Benny Chefetz, April 08-13, 2018. Multifunctional carbon nanotubes-iron oxide-Ag composite for water purification. *20th EGU General Assembly, EGU2018, Vienna, Austria.*
- **Bhaskar Bhaduri**, Maya Engel, Tamara Polubesova, Benny Chefetz, March 14-15, 2018. Bifunctional activity of nanocomposite towards water purification. The Annual Conference of The Hebrew University's Center for Nanoscience and Nanotechnology,

The Dead Sea, **Ein Bokek, Israel.**

- Naruki Hiranuma, Kouji Adachi, David Bell, Franco Belosi, Hassan Beydoun, **Bhaskar Bhaduri**, Heinz Bingemer, Carsten Budke, Franz Conen, Kimberly Cory, Joachim Curtius, Paul J. DeMott, Oliver Eppers, Sarah Grawe, Susan Hartmann, Nadine Hoffmann, Kristina Höhler, Dan Imre, Evelyn Jantsch, Konrad Kandler, Alexei Kiselev, Thomas Koop, Gourihar Kulkarni, Amelie Mayer, Ottmar Möhler, Masataka Murakami, Benjamin J. Murray, Markus D. Petters, Matteo Piazza, Michael Polen, Naama Reicher, Sabine Robrecht, Yinon Rudich, Atsushi Saito, Thea Schiebel, Gregory P. Schill, Johannes Schneider, Margaret Scott, Lior Segev, Emiliano Stopelli, Ryan C. Sullivan, Kaitlyn J. Suski, Miklos Szakall, Takuya Tajiri, Hans Taylor, Hannah Tekleab, Yutaka Tobo, Daniel Weber, Heike Wex, Thomas F. Whale, Craig Whiteside, Katsuya Yamashita, Alla Zelenyuk, and Soeren Zorn, January 7-11, 2018. A Comprehensive Dataset on the Immersion Freezing Behavior of Cellulose Particles. 98<sup>th</sup> Annual Meeting –American Meteorological Society, **Austin, USA.**
- Avi Lavi, Peng Lin, **Bhaskar Bhaduri**, Alexander Laskin, Yinon Rudich, April 23-28, 2017. The formation of light absorbing insoluble organic compounds from the reaction of biomass burning precursors and Fe(III). *19th EGU General Assembly, EGU2017, Vienna, Austria.*
- Naama Reicher, **Bhaskar Bhaduri**, Lior Segev, Yinon Rudich, January 16-17, 2017. Immersion freezing by plant nanocellulose and plant phytolith particles. Atmospheric Ice Nucleation Conference-Focus meeting 9, University of Leeds, **United Kingdom.**
- Yinon Rudich, Nir Bluvshstein, Peng Lin, Avi Lavi, **Bhaskar Bhaduri**, Raanan Carmieli, and Alexander Laskin, August 28- September 2, 2016. Biomass burning aerosols: Optical properties and identification of chromophores. *Towards a Molecular Level Understanding of Atmospheric Aerosols (Berkeley Lab), Santa Cruz, California, USA.*
- **Bhaskar Bhaduri**, Lior Segev, Yinon Rudich, June 06, 2016. Investigation of ice-nucleation of various dust particles under immersion freezing. *IVS-MRS Student Conference-2016, Weizmann Institute of Science, Rehovot, Israel.*
- **Bhaskar Bhaduri**, Lior Segev, Yinon Rudich, May 08, 2016. Investigation of ice-nucleation of nanocrystalline cellulose (NCC) under immersion freezing mode. *Nanotechnology from Academy to Industry 2016 (2<sup>nd</sup> International Symposium), Holon*

**Institute of Technology, Holon, Israel.**

- **Bhaskar Bhaduri**, Lior Segev, Yinon Rudich, March 28-30, 2016. Potential role of NCC in ice-nucleation. *Weizmann-Alberta Nanoscience Meeting*, **Weizmann Institute of Science, Rehovot, Israel.**
- **Bhaskar Bhaduri**, Lior Segev, Yinon Rudich, February 25, 2016. Investigation of Ice-Nucleation of Nanocrystalline Cellulose (NCC) under Immersion Freezing Mode. *Israel-India Workshop on Nanoscience and Nanotechnology*, **Weizmann Institute of Science, Rehovot, Israel.**
- **Bhaskar Bhaduri**, Nishith Verma, March 09-13, 2015. Nitrogen-enriched carbon nanofibers containing Cu-loaded porous carbon beads for the abatement of NO emissions. *Fourth International Conference on Multi-functional, Hybrid & Nanomaterials (Hybrid 2015)*, **Sitges (near Barcelona), Spain.**
- Akshay Modi, **Bhaskar Bhaduri**, Nishith Verma, March 09-13, 2015. Development of nitrogen-doped multi-scale web of carbon micro-nanofibers in one-step method. *Fourth International Conference on Multi-functional, Hybrid & Nanomaterials (Hybrid 2015)*, **Sitges (near Barcelona), Spain.**
- Akshay Modi, **Bhaskar Bhaduri**, Nishith Verma, December 27-30, 2014. Development of N-Functionalized and metal-decorated carbon nanofibers. *CHEMCON*, **Punjab University, India.**
- **Bhaskar Bhaduri**, November 1, 2014. Transition metal nanoparticles-grown carbon nanofibers containing carbon microfibrils and porous carbon beads for catalytic reaction applications. *Research Scholar Day*, **Indian Institute of Technology Kanpur, India.**
- **Bhaskar Bhaduri**, Nishith Verma, September 27-29, 2014. Effect of N-functionality on NO reduction over highly porous activated carbon beads (ACBs). *International Conference on Green Technologies for Environmental Pollution Control and Prevention*, **NIT Trichi, India.**
- **Bhaskar Bhaduri**, Priyankar Talukdar, Nishith Verma, August 23-27, 2014. Removal of NO over pyridine-treated Cu and CeO<sub>2</sub> bimetal nanoparticles dispersed ACFs/CNFs in a single-step process. *21<sup>st</sup> International Congress on Chemical and Process Industries*, **Prague, Czech Republic.**
- Priyankar Talukdar, **Bhaskar Bhaduri**, Nishith Verma, March 2-5, 2014. Effect of CeO<sub>2</sub>



doping on catalytic oxidation of NO over Cu metal nanoparticles grown carbon nanofibers at room temperature. *International Conference on Nanoscience and Technology (ICONSAT-2014)*, **Chandigarh, India**.

- **Bhaskar Bhaduri**, Priyankar Talukdar, Nishith Verma, October 3-5, 2013. Room temperature catalytic oxidation of NO over Cu metal nanoparticles grown carbon nanofibers doped with CeO<sub>2</sub>. *National Level Conference on Nanomaterial and Devices (NCONAD-2013)*, **NIT Srinagar, India**.
- **Bhaskar Bhaduri**, Parul Bajpai, Ashutosh Sharma, Nishith Verma, August 27-31, 2012. Preparation of CuCl<sub>2</sub> nanoparticle- dispersed activated carbon fibers for the production of O<sub>2</sub> from steam. *Eighth International symposium on surface heterogeneity effects in adsorption and catalysis on solids (ISSHAC- 8)*, **Krakow, Poland**, page no-100-102.
- **Bhaskar Bhaduri**, Shiv Singh, Nishith Verma, December 15-17, 2011. Cu- impregnated activated carbon micro and nanofibers for the production of oxygen from steam. 4<sup>th</sup> *International Congress of Environmental Research (ICER- 2011)*, **NIT Surat, India**.
- Shiv Singh, **Bhaskar Bhaduri**, Ashutosh Sharma, Nishith Verma, December 15-17, 2011. Ag- impregnated activated carbon micro and nanofibers for antimicrobial application. 4<sup>th</sup> *International Congress of Environmental Research (ICER- 2011)*, **NIT Surat, India**.
- **Bhaskar Bhaduri**, Somdutta Singha, Ujjaini Sarkar, December 27-30, 2009. Role of HDPE/ LDPE beads in the removal of hexa-valent Chromium from waste water. 62<sup>nd</sup> annual session, *CHEMCON*, **Andhra University, Visakhapatnam, India**.
- **Bhaskar Bhaduri**, December 1-2, 2009. Safety management and loss prevention in Chemical and allied Industry. **Kolkata, India**.

#### **ACADEMIC EXTRACURRICULAR ACTIVITIES**

- Coordinator-Unit Operation Laboratory (UOP lab), IIT Kanpur, India  
(Duration: 29<sup>th</sup> December 2012- 17<sup>th</sup> April 2013)
- Teaching assistant-UOP lab, IIT Kanpur, India  
(Duration: 31<sup>st</sup> December 2010- 27<sup>th</sup> April 2011)
- Research assistant- BET instrument (funded by DST-FIST project)

*(Duration: 26<sup>th</sup> December 2010- 15<sup>th</sup> March 2015)*

**Declaration:**

**The information mentioned above is true to the best of my knowledge.**

*Bhaskar Bhaduri*

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