

Bharat Bajaj

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SUMMARY

- My primary research focus is on synthesis, fabrication and characterization of nanomaterials and nanocoatings for water treatment, energy harvesting and gas adsorption.
- Extensive knowledge of sol-gel chemistry for nanoparticles synthesis, methodologies for the preparation of nanofibrous membranes, semiconducting photocatalysts for water splitting, photonic colloidal nanocrystals, fabrication of piezoelectric nanogenerators, bio-sensors, gas sensors and knowhow of nanocoating techniques,
- Knowledge of various advanced microstructural characterization tools include X-ray Diffraction (XRD), Atomic Force Microscope (AFM) Scanning electron microscope (SEM), Transmission electron microscope (TEM), Infra-Red spectroscopy (IR), Raman spectroscopy, UV-Vis, Cyclic Voltammetry (CV), X-ray Photoelectron Spectrometer (XPS), Differential Scanning Calorimeter (DSC), Thermogravimetric Analysis (TGA), BET and chemisorption for surface area. Viscosity measurement for fluids using Viscometer.
- Executed various mechanical properties characterization such as tensile, compression, fatigues well as electrical and optical property measurement tools.
- Authored around **15 international journal papers** and **6 registered patents**, and presented research work in 10 international conferences.

EDUCATION

1. (2010 -2013) **Ph.D. in Nanomaterials Science and Engineering**, *Department of Nanomaterials, Energy Material Research Center, Korea Research Institute of Chemical Technology, University of Science and Technology, South Korea*, (GPA: 4.04 / 4.5) **94.9 % Thesis title: Study of New Methods to Make Controlled Shape of Electrospun Fibers and their Eco-Friendly Coatings.** (Thesis submitted October 2012)
2. (2006-2008) **Master of Engineering (M.E) in Nanotechnology**, *Department of Material Science and Engineering, Chungnam National University, Daejeon, South Korea* (GPA: 3.75/4.5) **89% Thesis title: Immobilization of Biomolecules and Magnetic Bead on Sensor Junction for In-vitro Diagnostics**
3. (2001-2004) **Bachelors of Technology (B. Tech) in Chemical Engineering**, *Department of Chemical Engineering, Kurukshetra University, Haryana, India.* **68.12%**

• PROFESSIONAL CAREER:

Position	Place	Department	From	To
UGC-Assistant Professor	<i>Delhi Technological University, Formerly DCE, Delhi</i>	<i>Department of Applied Sciences</i>	November 2016	Present
Associate Professor	<i>Chandigarh University, Gharuan, Mohali, Punjab, India</i>	<i>Department of Chemical Engineering</i>	October 2016	November 2017
Brain Korea 21 Postdoctoral Fellow	<i>Yonsei University, Seoul, South</i>	<i>School of Electrical and</i>	May 2015	May 2016

	<i>Korea</i>	<i>Electronic Engineering</i>		
Postdoctoral Researcher	<i>Korea Institute of science and technology, South Korea</i>	<i>Carbon Convergence Material Research Center</i>	April 2013	March 2015
Graduate Research Assistant	<i>Korea Research Institute of Chemical Technology, South Korea</i>	<i>Energy Material Research Center</i>	February 2010	February kmi2013
Research Assistant	<i>Korea Atomic Energy Research Institute, South Korea</i>	<i>Radioisotope research division</i>	August 2008	February 2010

EXPERIENCE

Associate Professor, Department of Chemical Engineering *Oct 2016 to Present*
Chandigarh University, Gharuan, Mohali, Punjab, India

- Courses teaching : Engineering Material Composites, Nanotechnology, Industrial Pollution Abatement
- Projects Undergoing
 - **Experimental Studies of nanofibrous membrane for removal of micro-pollutant from the waste water (Young Scientist) 25lac (Approved by DST under Young Scientist Program)**
 - **Development of effective membranes, utilizing electrospinning techniques, for removal of micro-pollutants from the waste water (ECRA)35lac**

Brain Korea 21 Postdoctoral Fellow, School of Electrical and Electronic Engineering, May 2015 to May 2016
Electronic Device Laboratory, Yonsei University, Seoul, South Korea

- Course Taught: Nanofabrication techniques
- Trained and supervised students and personnel on various instruments and laboratory procedures,
- Involved in writing of research proposals, as well as of many hybrid metal matrix composite projects, energy harvesting, and water treatment development projects.

Postdoctoral Researcher, Carbon Convergence Material Research Center Apr 2013 to Mar 2015
Korea Institute of science and technology, South Korea

- Functionalized nanofibers of metal nanoparticles by electrospinning for biosensor, supercapacitor, and catalyst application.
- Synthesis of metal oxide and polymer nanocomposites (Nickel, Copper, Zinc, Titanium, Cerium and Silver).
- Production of flexible and activated porous carbon nanofibers webs for effective H₂S gas adsorption and NO_x gas sensors.
- Trained and supervised students and personnel on various instruments and laboratory procedures, such as FE-SEM, X-ray Diffractometer (XRD).
- Involved in writing of research proposals.

Graduate Research Associate, Energy Material Research Center Feb 2010- Feb 2013
Korea Research Institute of Chemical Technology, South Korea

- Synthesis of polyamide imide membranes for battery application and ultrafine highly aligned continuous submicron range fibers of various polymers (PAI, PAN, PVA, etc.) for its application as flexible substrate in fuel cells.
- Guided students and personnel on electrospinning and nanocoating techniques.
- A modified electrospinning method was designed to promote an efficient one-step coating system utilizing a novel blend of PAI/PTACM, producing high strength, insoluble, temperature-resistant fiber.
- Fibers of different controllable shapes (coiled, aligned, and porous) were fabricated by varying the process parameters.
- Electrospun nanofibers utilizing silicon, graphene, CNT and iron oxide nanofillers to prepare nanocomposite fibers.
- Studied eco-friendly coating of various metal and metal oxides (Pd, Cu and Ag) nanoparticles.
- Develop low temperature carbonization technique for polyacrylonitrile (PAN) based continuous nanofibers.

Research Assistant, Radioisotope Research Division

Aug 2008 to Feb 2010

Korea Atomic Energy Research Institute, South Korea

- Synthesized and characterized functionalized iron oxide nano particles (Fe_2O_3) by one pot synthesis method and successfully conjugated cancer receptor folate on the surface of nanoparticles.
- Conjugation of Bi-functional chelators (BFCA) to nanoparticles and used with tumor target peptides.
- Efficacy study of nanoparticles for MRI imaging, biosensing & cancer therapy.
- Characterized these composites and composite coatings, which includes XRD, SEM, TEM, XPS and particle size analyzer.

INDUSTRIAL EXPERIENCE

Project Engineer, S.G associates, India.

June 2005 to July 2006

- Pharmaceutical consultancy.

Trainee Engineer

Pepsi foods India and Pfizer India limited.

PATENTS & PUBLICATION

Title of Intellectual Property Right	Author Ranking	International	Application / Registration	Number of Application / Registration
Apparatus for increasing strength of nano carbon fiber by mechano-electrospinning and method thereof	3/4	International	Registered	10-2011-0129126
Nano and semi-nano sized fiber, and preparation method for thereof	4/5	International	Registered	10-2011-0102102
Copper Plated nanoweb electrode	2/4	International	Registered	10-2012-0090684
Fabrication of coiled nanofiber and its application products	2/4	International	Registered	10-2012-0112431
The preparing method of conductive long fiber coated with silver nanoparticles thereby	1/5	International	Registered	10-2012-0152269
Formation of uniform silver layer by electroless silver plating on wet coated polymer fiber using PEG	1/5	International	Registered	10-2012-1468380

PUBLICATIONS

- B Bajaj, HI Joh, SM Jo, S lee, S Singh (2016) Detection of humic acids from water using flexible CNF electrode based biosensors. Biosensor and Bioelectronics (**IF= 7.476**). In pipeline.
- B Bajaj, KB Yi, HI Joh, SM Jo, S Lee (2017) Enhanced reactive H₂S adsorption using carbon nanofiber supported with Cu/Cu₂O nanoparticles Applied Surface Science (**IF=3.1**) 429, 253-257,2018.
- B Bajaj, S Hong, SM Jo, S Lee, HJ Kim (2016) Flexible carbon nanofiber electrodes for a lead zirconatetitanate nanogenerator. RSC advances (**IF=3.84**), 6:64441-64445.
- B Bajaj, HI Joh, SM Jo, G Kaur, A Sharma, M Tomar, V Gupta, S Lee (2016) Controllable one step copper coating on carbon nanofibers for flexible cholesterol biosensor substrates. Journal of Material Chemistry B (**IF=4.7**), 4:229-236.
- S Kim, B Bajaj, CK Byun, S-J Kwon, HI Joh, KB Yi, S Lee (2014) Preparation of flexible zinc oxide/carbon nanofiber webs for mid-temperature desulfurization. Applied Surface Science (**IF=3.150**), 320:218-224.
- B Bajaj, S Kim, K-B Yi, HI Joh, SM Jo, S Lee (2014) Effect of carbon nanofibers supported with metal oxide nanoparticles on H₂S adsorbent properties. Advance Science Letters (**IF=1.253**), 20:1224-1227.
- B Bajaj, B Kim, S Yoon, J Lee, BK Park, (2014) One-Step continuous coating of silver nanoparticles on well aligned fibers of PAI/PTACM. Fibers and Polymers (**IF=1.022**), 15:47-56.
- JH Kim, B Bajaj, S Yoon, SH Kim, J Lee (2013) Strength increase of medium temperature carbonized PAN nanofibers made by mechano-electrospinning. Composites Research (**IF=0.531**), 26:160-164.
- B Bajaj, S Yoon, BH Park, J Lee (2012) Coiled fibers of poly(amide-co-imide) PAI and poly (trimellitic anhydridechloride-co-4, 4'-methylene dianiline) (PTACM) by using mechano-electrospinning. Special Issue - June 2012 - Fibers Edition of Journal of Engineering Fiber and Fabrics (**IF=0.986**), 7:37-41.
- B Bajaj, S Lee, S Yoon, BH Park, B Kim, BK Park, J Lee (2012) Effect of new poly(amide-co-imide)/poly(trimellitic anhydride chloride-co-4,4'-methylenedianiline) blends on nanofiber web formation. Journal of Materials Chemistry (**IF=8.262**), 22:2975-2981.
- B Bajaj, SH Lee, JH Kim, SJ Yoon, BK Park, JR Lee (2012) Study of well aligned continuous electrospun nanofibers of poly(amide-co-imide)/poly (trimellitic anhydride chloride-co-4, 4'methylenedianiline) using solvent mixture of DMSO/THF. 18th International Conference on Composite Materials Conference Proceeding.
- S Singh, BC Yadav, R Prakash, B Bajaj, J-R Lee (2011) Synthesis of nanorods and mixed shaped copper ferrite and their applications as liquefied petroleum gas sensor. Applied Surface Science (**IF=3.150**), 257:10763–10770.
- B Bajaj, BD Malhotra, S. Choi (2010) Preparation and characterization of bio-functionalized iron oxide nanoparticles for biomedical application. Thin Solid Films (**IF=1.759**), 519:1219-1223.
- B Bajaj, NT Thanh, CG Kim (2007) Planar hall effect in spin valve structure for DNA detection immobilized with single magnetic bead. IEEE Conference proceedings, Nanotechnology, 3:1033-1036.
- TQ Hung, PH Quang, NT Thanh, S Oh, B Bajaj, CG Kim (2007) The Contribution of the exchange biased field direction in multilayer thin films to planar hall resistance. Physica status solidi (b) (**IF=1.605**), 244:4431-4434.

Presentations

- Invited talk in Faculty Development Programme “ Precision Manufacturing and Circular Economy 18) at Delhi Technological University. 4-8th June 2018.
- Presentation at “Applications of radioisotopes and radiations technology in Industry, healthcare and agriculture (ARRTIHA-2016) on Nov 28-29, 2016 at Thapar University, Patiala, India
- Oral Presentation at “National level conference on green nano technology-II(GRNATE-II) on Nov.15,16 2016 at Chandigarh University, Mohali, India.
- Visiting Scholar at Mechanical Engineering Department, Cleveland State University, and Cleveland, USA. June 2016 to Aug 2016.
- Invited Talk at “International Conference on Nanoscience & Nanotechnology (ICNN-2013)” during 1820 November, 2013 at BabasahebBhimraoAmbedkar University, Lucknow, U.P., India.
- Presentation at “International Conference and Expo on Material Science and Engineering” Chicago USA, October 22-26, 2012
- Attended Electrospin 2012, 2nd International Conference on Electrospinning in Jeju, South Korea, May 29June 1, 2012.

Awards and Fellowships:

YEAR	Awards & Fellowships
2016	Best Poster Presentation award in healthcare sector at Applications of radioisotopes and radiations technology in Industry, healthcare and agriculture (ARRTIHA-2016) on Nov 28-29, 2016 at Thapar University, Patiala, Punjab.
2015	Research articles is highlighted on the back cover of Journal of Material Chemistry B
2015-2016	Brain-Korea 21 (BK-21) Postdoctoral Fellowship , <i>Yonsei University, South Korea</i>
2013-2015	Visiting Scientist , Korea Institute of Science and technology
2011-2012	Foreign student representatives of University of Science and Technology
2011-2012	Student Council Member University of Science and Technology
2012	Winner of Overseas program from University of Science and Technology , Received full support to attend the “International Conference and Expo on Material Science and Engineering,” conference in Chicago USA, October 22nd 2012
2008	Best Poster Presentation Award on “Effective immobilization of DNA using different spotting techniques” in the BK-21 conference held in Cheonan, S. Korea

REVIEWER

FWO Belgium, Fiber and Polymers, Applied surface science, Materials Science and Engineering A, Materials Science and Engineering C, Journal of Material Chemistry, Surface & Coatings Technology, Metallurgical and Materials transactions A, Biosensor and Bioelectronics, Thin Solid Films.