

Dr. Meetu Bharti

Assistant Professor

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A) Educational Qualification:

Degree	Year of Passing	University
Ph.D.	2019	BARC Mumbai(RRC of Mumbai University)
LLB	2011	M.D. University, Rohtak
CSIR-UGC NET	2009	
M.Phil.	2008	Ch. Devi Lal University, Sirsa, Haryana
M.Ed.	2005	M.D. University, Rohtak
M.Sc.	2004	M.D. University, Rohtak
B.Ed.	2002	M.D. University, Rohtak
B.Sc.	2001	M.D. University, Rohtak

B) Career Profile:

Designation	Institute Served	Duration
Assistant Professor	A.I. J.H.M. College , Rohtak	26 th July 2008- till date
Visiting Researcher	University of Tsukuba, Tsukuba, Ibaraki, Japan	July 2018-Oct.2018

Research Experience

- (i) Recently, worked in the field of organic thermoelectrics for my Ph.D. In the present study, we have tried to investigate the feasibility of conducting polymers for thermoelectric applications. To have practical applications on curved hot surfaces, we synthesized conducting polymers based films on flexible substrates as well as in free-standing form, using drop-casting method and photo- as well as chemical-polymerization route. These films were characterized through many techniques. The work presents a lay-out regarding thermoelectric performances of various conducting polymers depending upon their specific structural and physico-chemical properties.

From the results obtained as the outcome of the thesis, we have identified the (i) factors affecting thermoelectric performance; (ii) strategies required for improvement of the power factor (due to inherent low thermal conductivity); and (iii) challenges that still lie ahead; in the field of organic thermoelectrics.

A detailed analysis of electrical and thermal transport-mechanisms along with various processes such as stretching, controlled doping and addition of inorganic materials/carbon nanostructures, have been proposed for enhancement of the thermoelectric figure-of-merit. A few prototype thermoelectric power generators using substrate-adherent as well as free-standing films have also been demonstrated. Besides this, some of the experiments have also been focussed to synthesize stable n-type polymers.

- (ii) Worked as a Visiting Researcher for three months at **University of Tsukuba, Tsukuba, Japan**, to carry out ESR studies on polymer films.
- (iii) Also, worked as a research student in Bhabha Atomic Research Centre, Mumbai from July 2007 to January 2008 for M.Phil. Thesis on the project- “Synthesis, Isolation and Characterization of metal oxides nanomaterials (ZnO, CuO) and their applications in gas sensing”.

Working experience

- (i) Thin film deposition using thermal evaporation and electron beam evaporation.
- (ii) Chemiresistive gas sensors and response curve characterization setup.
- (iii) Synthesis of ZnO nanostructures (via direct evaporation of zinc and by carbothermal reduction), ZnO thin and thick films deposition and their characterization by XRD, PL, IR, SEM, EDX.
- (iv) Isolation of ZnO and CuO nanowires by dielectrophoresis technique.
- (v) Gas Sensing studies of: isolated ZnO nanowires/nanobelts, comparative sensing properties of ZnO single crystal with thick films and isolated nanostructures, CuO nanowire and nanomesh.
- (vi) Synthesis of organic, organic-inorganic composite films (substrate-adherent as well as free-standing) for thermoelectric applications.
- (vii) Measurement of thermoelectric properties to design a prototype organic thermoelectric power generator.
- (viii) Design and development of a set-up to carry out simultaneous measurements of Seebeck coefficient and electrical conductivity of polymeric films.
- (ix) ESR studies on conducting polymer films.

Area of Interest

- Investigations of thermoelectric and gas sensing properties of organic / inorganic films.

Achievements

- (i) Contributed to the College administration / student activities by being a convener/member of various committees such as:
 - Member of Internal Quality Assurance Cell.
 - Working as a Joint Secretary of Alumni Association of the College
 - Hostel Warden for One year
 - Incharge of Student Activity Cell for three years
 - Worked as a Programme Officer under National Service Scheme for four years
 - Worked as Treasurer of Teachers' Club
 - Worked as a member of Women Cell and Students' Grievance Cell.
- (ii) Won 2nd prize at P.G. level in Poster Competition organized by Dept. of Physics.
- (iii) Participated in declamation at State Level
- (iv) Delivered an Invited talk organized by Career and placement Cell at R.K.Talreza College, Ulhas Nagar, Mumbai (2017)

Participation in Seminars/Conferences/Workshops

- (i) Tsukuba Global Science Week 2018 organized by University of Tsukuba, Tsukuba, Japan, 20-22 September, 2018.
- (ii) 69th Divisional Meeting of Division of Colloid and Surface Chemistry organized by University of Tsukuba, Tsukuba, Japan, 18-20 September, 2018.
- (iii) 7th International Conference on Perspectives in Vibrational Spectroscopy (ICOPVS-2018) organized by Bhabha Atomic Research Centre, Mumbai, 25-29 November, 2018.
- (iv) Lecture Workshop on Lasers and their applications organized by IWSA Mumbai, 20-21 January, 2018.

- (v) Workshop on Thin Film and Coating Technology, International Union for Vacuum Science, Technique and Application and Department of Atomic Energy, India, 13th November, 2018.
- (vi) Prof. R C Paul National symposium on Innovations in Chemical Sciences organized by Department of Chemistry & Centre of Advanced Studies in Chemistry, Panjab University, Chandigarh, 20-21 March, 2015

Publications (In Journals)

1. Meetu Bharti, Ajay Singh, Gajender Saini, Sudeshna Saha, Anil Bohra, Yuki Kaneko, A. K. Debnath, K. P. Muthe, Kazuhiro Marumoto, D. K. Aswal, S. C. Gadkari, Boosting thermoelectric power factor of free-standing PEDOT:PSS films by incorporation of Bi_{0.5}Sb_{1.5}Te₃ nanostructures, *Journal of Power Sources*, **435**, 226758, (2019), (I.F. 7.4) ISSN: 0378-7753
2. Meetu Bharti, P. Jha, Ajay Singh, A. K. Chauhan, Shantanu Misra, Masato Yamazoe, A. K. Debnath, Kazuhiro Marumoto, K. P. Muthe, D. K. Aswal, Scalable free-standing polypyrrole films for wrist-band type flexible thermoelectric power generator, *Energy*, **176**, 853-860, (2019), (I.F. 5.5) ISSN: 0360-5442
3. Meetu Bharti, Ajay Singh, Soumen Samanta, D. K. Aswal, “Conductive polymers for thermoelectric power generation”, *Progress in Materials Science*, **93**, 270-310, (2018), (I.F. 31.1) ISSN: 0079-6425
4. Meetu Bharti, Ajay Singh, Soumen Samanta, A.K. Debnath, Kazuhiro Marumoto, D.K. Aswal, K.P. Muthe, S.C. Gadkari, “Elucidating the mechanisms behind thermoelectric power factor enhancement of Poly(3,4-ethylenedioxythiophene):poly(styrenesulfonate) flexible films”, *Vacuum*, **153**, 238-247, (2018), (I.F. 2.01) ISSN: 0079-6425, ISSN: 0042-207X
5. Nishant Chaudhary, Meetu Bharti, Ajay Singh, D.K. Aswal, S.P. Koiry, A. K. Debnath, S. Acharya, “Electron beam induced modifications in electrical properties of Poly(3,4 ethylenedioxythiophene) : poly (styrenesulfonate) films, *Vacuum*, **152**, 243-247, (2018), (I.F. 2.01) ISSN: 0042-207X.

6. Meetu Bharti, Ajay Singh, Soumen Samanta, A. K. Debnath, D. K. Aswal, K.P. Muthe, S. C. Gadkari, “Flexo-green polypyrrole – Silver nanocomposite films for thermoelectric power generation”, *Energy Conversion and Management*, **144**, 143-152, (2017), (I.F. 6.37) ISSN: 0196-8904.
7. Shantanu Misra, Meetu Bharti, Ajay Singh, D. K. Aswal, Y. Hayakawa, “Nanostructured polypyrrole: enhancement in thermoelectric figure of merit through suppression of thermal conductivity”, *Materials Research Express*, **4**, 085007, (2017), (I.F. 1.5) ISSN: 2053-1591.
8. R.S. Bansal, Meetu Bharti and S.S.Hooda, “Superposition-Model analysis of zero-field splitting parameters for Mn^{2+} in NSHH and MSHH single crystals”, *Indian Journal of Physics*, **87** (6), 533-535 (2013), (I.F. 1.5) 0974-9845
9. R.S. Bansal, Poonam Ahlawat, Meetu Bharti and S. S. Hooda, “Superposition Model Analysis of Zero field splitting for Mn^{2+} in some host single crystals”, *Indian Journal of Physics*, **87** (7), 639-642 (2013), (I.F. 1.5) 0974-9845
10. Manmeet Kaur, Shiv Veer Singh Chauhan, Shivangi Sinha, Meetu Bharti, Rajneesh Mohan, S. K. Gupta, and J. V. Yakhmi, “Application of aligned nanowires/nanobelts as a room-temperature NO gas sensor” *Journal of Nanoscience and Nanotechnology*, **9**, 5293-5297, (2009), (I.F. 1.5) ISSN:1533-4880

(In Conference Proceedings)

1. Meetu Bharti, Ajay Singh, Anil Bohra, Soumen Samanta, A.K. Debnath, K.P. Muthe, DK. Aswal, “Hybrid thermoelectric power generator by uniting p-type PEDOT:PSS and n-type Bi_2Se_3 films,” *Proceedings of International Conference on Thin Films (ICTF-2017), Delhi, (2017)*.

2. Meetu Bharti, Ajay Singh, K. P. Muthe, S. C. Gadkari, “Thermoelectricity: A clean and green option in pursuit of energy demands”, *Proc of India International Science Festival (IISF-2016), Delhi, (2016)*.
3. Meetu Bharti, Soumen Samanta, Ajay Singh, K.P. Muthe, D. K. Aswal, Thermoelectric properties of flexible polypyrrole-silver nanocomposites films, *DAE-BRNS symposium on Condensed Matter Physics under extreme conditions (COMPEC-2016), Mumbai, (2016)*.
4. Meetu Bharti, Manmeet Kaur, Rajneesh Mohan, S.K. Gupta and J.V. Yakhmi, “Room-temperature gas sensing properties of ZnO nanobelts/nanowires” *Proceedings of International Conference on Advanced Materials, (ICAM), Kottayam, (2008)*.
5. Manmeet Kaur, Krishnakant, Meetu Bharti, Kailasa Ganapathi, Mainak Roy, A.K. Tyagi, S.K. Gupta and J.V. Yakhmi, “Growth and Characterization of ZnO Nanotetrapod” *Proc of DAE Solid State Physics Symposium (SSPS), Mysore, (2007)*.