Dr. Bhanu Bhusan Khatua, Ph.D.

Professor, Indian Institute of Technology Kharagpur

Professor
Materials Science Centre
Indian Institute of Technology Kharagpur
Kharagpur-721302,
West Bengal,
India

Nationality: Indian
Date of birth: 7th January, 1974
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Present Research Activities

1. Energy Materials (Piezoelectric, Triboelectric and hybrid nanogenerators for energy harvesting and Supercapacitors as energy storage)
2. EMI Shielding Materials (Polymeric and Hybrid composites)
3. Polymer/clay Nanocomposites, Morphology Control in Incompatible Polymer Blends using Nanoclay
4. Reactive Polymer Blends: Processing and Characterizations
5. Electrically Conducting Polymeric PTCR Composites, Polymer nanocomposites (CNT, CNH, Graphene, etc.) for electronics applications

Academic Records

PhD in Polymer Science & Engineering, 2001
Materials Science Centre, Indian Institute of Technology Kharagpur, Kharagpur, India
Thesis: (Supervisor: Prof. C. K. Das)
MSc in Chemistry, 1996, (*University Gold Medalist)
Department of Chemistry, Vidyasagar University, Midnapore, India
BSc with Honours in Chemistry, 1994, First Class
Vidyasagar University, Midnapore, West Bengal, India

Awards and Honours

- University Gold Medal Winner for standing 1st in M. Sc. (1996)
- Biswanath De Gold Medal Winner for standing 1st in M. Sc. (1996)
- Post Doctoral Research Fellowship from Technion-Israel Institute of Technology (IIT- Haifa), Israel (December-2000 ~ February-2002)
- KOSEF Post Doctoral Research Fellowship from POSTECH-Pohang University of Science & Technology, South Korea (July-2002 ~ April-2004)
- Patent Award from GE India Technology Centre, Bangalore

Previous Records

- December 2000 – February 2002: Post Doctoral Research Associate, Chemical Engineering Department, Technion – Israel Institute of Technology (IIT -Haifa), Israel.
- July 2002 – April 2004: Post Doctoral Research Associate, Polymer Research Institute, Department of Chemical Engineering, POSTECH – Pohang University of Science and Technology, South Korea.
- May 2004 – April 2007: Research Scientist, Polymer Science and Technology, JFWTC, GE India Technology Centre, Bangalore, India.
- May 2007-July 2013: Assistant Professor, Materials Science Centre, IIT Kharagpur, India.
- August 2013-Dec 2018: Associate Professor, Materials Science Centre, IIT Kharagpur, India.
- December 2018 - Present: Professor, Materials Science Centre, IIT Kharagpur, India.

Research Experience: (Since 1997)

Research Fields:

- Energy Materials (Piezoelectric, Triboelectric and hybrid nanogenerators for energy harvesting and Supercapacitors as energy storage)
- EMI Shielding Materials (Polymeric and Hybrid composites)
- Preparation of Elastomer/Elastomer and Elastomer/Plastics blends by different blending techniques
- Studies on the effect of inter-chain crosslinking reaction on properties of reactive Polymer Blends and Composites
- Polymer Processing, Polymer Blend Morphology and Characterizations
- Synthesis of polymer clay nanocomposites by Suspension polymerization, Bulk polymerization, Solution Polymerization, etc.
- Structure–Properties relations in melt-processable Polymer-clay nanocomposites
- Polymer-Carbon nanotube composites: Structure – Property analysis
- Electrically Conducting Polymer – Filler Composites: PTCR applications

Research Projects Completed/Undertaken at IIT Kharagpur

- **Project Title** : Synthesis by Suspension Polymerization and Characterization of PMMA/clay and PS/clay Nanocomposites
  Principal Investigator : Bhanu Bhusan Khatua
  Sponsor : SRIC, IIT Kharagpur, **Funds**: **3.40** Lakhs
- **Project Title** : Development of Phase Morphology in Incompatible Polymer Blends by using Nanoclay
  Principal Investigator : Bhanu Bhusan Khatua
  Sponsor : DST, New Delhi , **Funds**: **17.18** Lakhs
- **Project Title** : Use of Nanocomposites for Efficient Welding of Thermoplastics
  Principal Investigator : Prof. C. K. Das
  Co-Principal-Investigators : Bhanu Bhusan Khatua
  Sponsor : DST, New Delhi, **Funds**: **7.90** Lakhs
- **Project Title** : Development of Suitable Production System for Natural Rubber Coated Jute Fabrics for Novel End Uses
  Principal Investigator : Prof. Basudam Adhikari
  Co-Principal-Investigators : Bhanu Bhusan Khatua
  Sponsor : JMDC, Kolkata, **Funds**: **30.00** Lakhs
- **Project Title** : **:** Novel Polymeric Composite Membranes for Selective Separation of Gas Mixtures
  Principal Investigator : Prof. Susanta Banerjee
  Co-Principal-Investigators : Bhanu Bhusan Khatua
  Sponsor : DST, New Delhi, **Funds**: **55.00** Lakhs
- **Project Title:** Development of electrical conductivity and EMI shielding effectiveness in polymer/MWCNT/graphene composites at very low filler loading
  Principle Investigator: Bhanu Bhusan Khatua
  Sponsor: DST, New Delhi, Funds: **Rs. 5919600**/

Teaching Experience at IIT Kharagpur (Since 2007: Subjects taught / teaching)

At the undergraduate level:

1. Polymer Technology (B. Tech Course), 2017-2018

At the postgraduate (M.Tech.) level: Since 2007

1. Processing and Fabrication of Polymers (M. Tech Course)
2. Polymer Blends And Alloys (M. Tech Course)
3. Materials Laboratory (M. Tech Course)
4. Advanced Materials Laboratory (M. Tech Course)

Research Guidance at IIT Kharagpur

Ph.D. Awarded (7)

SL No.	Year	Name & Current position	Thesis Title
1.	2018	**Ranadip Bera** (Postdoctoral Researcher, National University of Singapore, Singapore)	Polymer/Carbonaceous Nanofiller Conducting Composites for Efficient Electromagnetic Interference Shielding Through Enhanced Microwave Absorption
2.	2015	**Nilesh Kumar Shrivastava** (Job in TORAY Company, Malaysia)	A comprehensive approach to minimize electrical percolation threshold of In-situ polymerized polymer nanocomposites by selective dispersion of multi-wall carbon nanotube
3.	2015	**Supratim Suin** (Assistant Professor, Vivekananda Centenary College, Rahara, W.B., India)	Retention of optical transparence of polycarbonate in polycarbonate/clay nanocomposites: preparation and its characterizations
4.	2014	**Sandip Maiti** (Postdoctoral Researcher, Pohang University of Science and Technology, South Korea)	A strategy to achieve low percolation threshold with high electrical conductivity in polymer/carbon nanotube nanocomposites based on polycarbonate
5.	2011	**Sumana Mallick** (Assistant Professor, Techno India, Kolkata, India)	Role of nanoclay on morphology and properties of immiscible by binary polymer blends
6.	2012	**Prativa Kar** (Assistant Professor, Gandhi Institute of Engineering and Technology, Odisha)	Positive temperature coefficient to resistivity characteristics of polymer composites based on coefficient of thermal expansion mismatch phenomena

Ph.D. Awarded (Co-Guidance)

SL No.	Year	Name & Current position	Thesis Title
7.	2016	Ansuman Barman **(**CIPET Haldia), PhD Co-Guidance, Degree awarded from Jadavpur University, Kolkata	Preparation and Characterization of Composites made from Agro-based Natural fibers and Thermoplastics and Study of Their Industrial Applications

Current PhD Students

SL No.	Name	Area of Research
1.	**Sumanta Kumar Karan**	Piez/pyro/triboelectric materials for energy harvesting applications
2.	**Amit Kumar Das**	Polymer nanocomposites for supercapacitor applications
3.	**Sarbaranjan Paria**	Polymer nanocomposites for piezoelectric applications
4.	**Anirban Maitra**	Polymer nanocomposites for hybrid supercapacitor applications
5.	**Lopamudra Halder**	Polymer nanocomposites for supercapacitor applications
6.	**Aswini Bera**	Polymer nanocomposites for supercapacitor applications
7.	**Suman Kumar Si**	Piezoelectric energy harvesting materials
8.	**Anurima De**	Conducting polymer nanocomposites for EMI shielding applications
9.	**Suparna Ojha**	Piezoelectric energy harvesting materials
10.	**Sumanta Bera**	Piezoelectric energy harvesting materials

Master Student Guidance (30) Completed

MS	**1**	
M.Tech.	Completed	Ongoing
	29	3

Patents Filed:

1. Piezoelectric Energy Harvesting through Bio-waste Eggshell Membrane, *Sumanta Kumar Karan, Sandip Maiti, Bhanu Bhusan Khatua. Submitted for filing (Application No-21460). IIT Kharagpur, India, 2019*.

2. Spider Silk fiber based Novel Bio-Piezoelectric Energy Harvester, ***Bhanu Bhusan Khatua***, *Sumanta Kumar Karan, Sandip Maiti, Jin Kon Kim. Filed, India, 2018 (Application No: 201831036382).*

3. Harvesting mechanical energy through bio-piezoelectric energy harvester using bio-waste onion skin, ***Bhanu Bhusan Khatua***, *Sumanta Kumar Karan, Sandip Maiti, Jin Kon Kim. Filed, India, 2017 (Application No: 201831024973).*

4. Inherent Polymeric PTCR Composites: Article and Associated Device, ***Bhanu Bhusan Khatua***, *Sumanda Bandyopadhyay, Soumyadeb Ghosh & N. S. Hari, US Patent, US20080006795A1*.

5. Inherent Polymeric PTCR Composites: Article and Associated Method, ***Bhanu Bhusan Khatua***, *Sumanda Bandyopadhyay, Soumyadeb Ghosh, N. S. Hari & F. Marcx, US Patent, US20080006796A1*.

6. Inherent Polymeric PTCR Composites: Composition and Associated Method, ***Bhanu Bhusan Khatua***, *Sumanda Bandyopadhyay, Soumyadeb Ghosh, N. S. Hari & F. Marcx, US Patent, US20080009572A1*.

7. Inherent Polymeric PTCR Composites: Composition and Associated Method, ***Bhanu Bhusan Khatua***, *Sumanda Bandyopadhyay, Soumyadeb Ghosh & N. S. Hari, US Patent, US20080009578A1*.

8. Polymer Matrix and Filler with a Curie Temperature for a Circuit Opening Device, ***Bhanu Bhusan Khatua***, *Sumanda Bandyopadhyay, Soumyadeb Ghosh, N. S. Hari & F. Marcx, WO2008/008573A1*.

Book chapter:

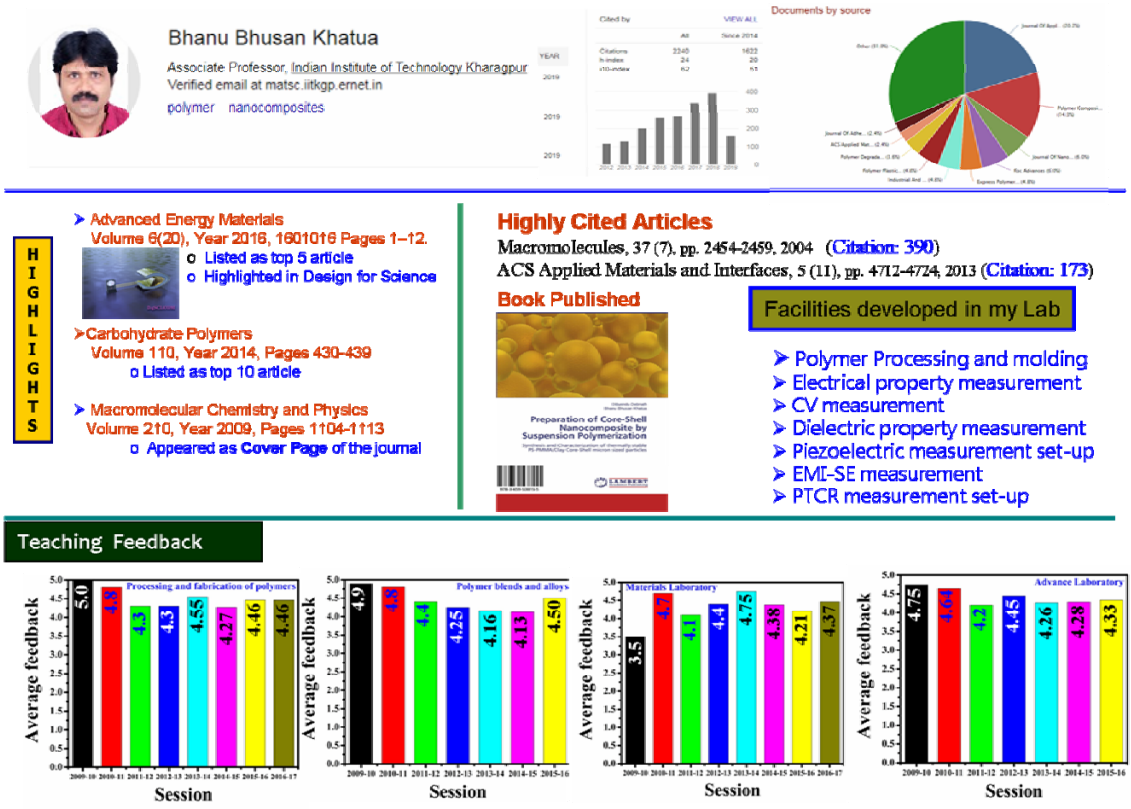
1 Preparation of Core-Shell Nanocomposite by Suspension Polymerization. Dibyendu Debnath and Bhanu Bhusan Khatua. LAP LAMBERT Academic Publishing, 2014, ISBN-13: 978-3-659-53815-5, ISBN-10: 3659538159.

2 Graphene, Its Analogues and Modern Science. Sandip Maiti, Sumanta Kumar Karan and Bhanu Bhusan Khatua. (**Under Revision**).

List of Publications in International Journals: 103 (Publication attached)

: 6 (Under Revision)

Papers Presented in International/National Conferences: 62 (List attached)



Research Highlighted/Featured

Spider Silk based Piezoelectric Energy Harvester

1. Spider silk helps generate electricity. (***Nature Asia, 2018***) Link: https://www.natureasia.com/en/nindia/article/10.1038/nindia.2018.117
2. Piezoelectric nanogenerators made from spider silk. (***Nanowerk, 2018, USA***). Link: https://www.nanowerk.com/spotlight/spotid=50432.php
3. The magic of spun silk. (***The KGP Chronicle, 2018***). Link: http://www.kgpchronicle.iitkgp.ac.in/the-magic-of-spun-silk/
4. How to use spider silk to generate energy and power a pacemaker. (***The Indian Express, 2018***)

   Link: https://indianexpress.com/article/explained/iit-kharagpur-spider-silk-to-generate-energy-and-power-a-pacemaker-5243161/

Eggshell Membrane based Piezoelectric Energy Harvester

5. Energy generators, wearable sensors from eggshell membrane. (***Nature Asia, 2018***). Link: https://www.natureasia.com/en/nindia/article/10.1038/nindia.2018.71
6. Eggshell membranes from bio waste could be harvesters for green energy. (***Nanowerk, 2018, USA***) Link: https://www.nanowerk.com/spotlight/spotid=50417.php
7. INNOVATION: IIT scientists use eggshell membrane to generate electricity. (***The Economic Times, Energy World, 2018***). Link: https://energy.economictimes.indiatimes.com/news/power/innovation-iit-scientists-use-eggshell-membrane-to-generate-electricity/64772364
8. Electricity from Eggshells: IIT Kharagpur Finds Novel Way to Power Wearable Gadgets! (***The Better India, 2018***). Link: https://www.thebetterindia.com/147901/eggshells-electricity-iit-kharagpur-news/
9. IIT scientists use eggshell membrane to generate electricity: Here's how. (***DNA, 2018***). Link: https://www.dnaindia.com/science/report-iit-scientists-use-eggshell-membrane-to-generate-electricity-here-s-how-2629944

Onion Skin based Piezoelectric Energy Harvester

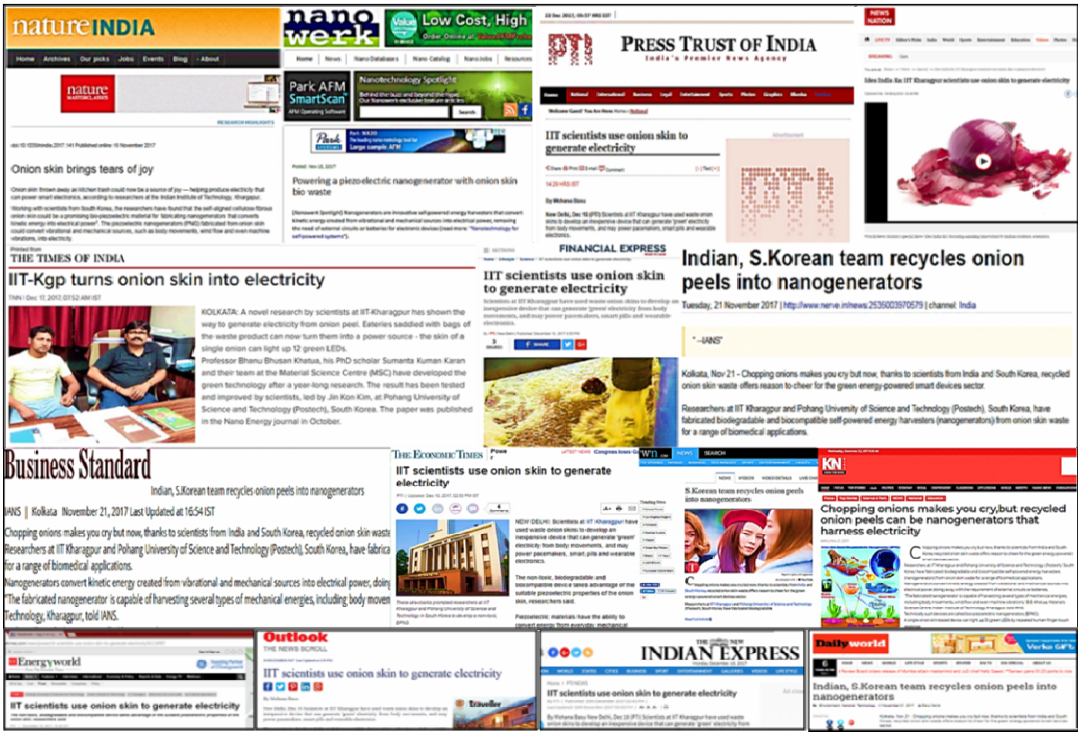
10. Powering a piezoelectric nanogenerator with onion skin bio waste. (***Nanowerk, 2017, USA***). Link: https://www.nanowerk.com/spotlight/spotid=48645.php.
11. Onion skin brings tears of joy. (***Nature Asia, 2017***) Link: https://www.natureasia.com/en/nindia/article/10.1038/nindia.2017.141
12. **Idea India Ka**: IIT Kharagpur scientists use onion skin to generate electricity. (***News Nation, 2018, India***). Link (***Video***): http://www.newsnation.in/videos/special/idea-india-ka-iit-kharagpur-scientists-use-onion-skin-to-generate-electricity-105/38023. YouTube link: https://www.youtube.com/watch?v=bAb9_2DpPJk
13. Now, peel onions and generate electricity! IITKgp will tell you how…(***IIT Kharagpur***). YouTube link: https://www.youtube.com/watch?v=aTtlA2FBL7w
14. Bio-waste onion skin as innovative nature-driven piezoelectric material with high energy conversion efficiency. Advanced Engineering, 2018. Link: https://advanceseng.com/bio-waste-onion-skin-piezoelectric-material-high-energy-conversion-efficiency/

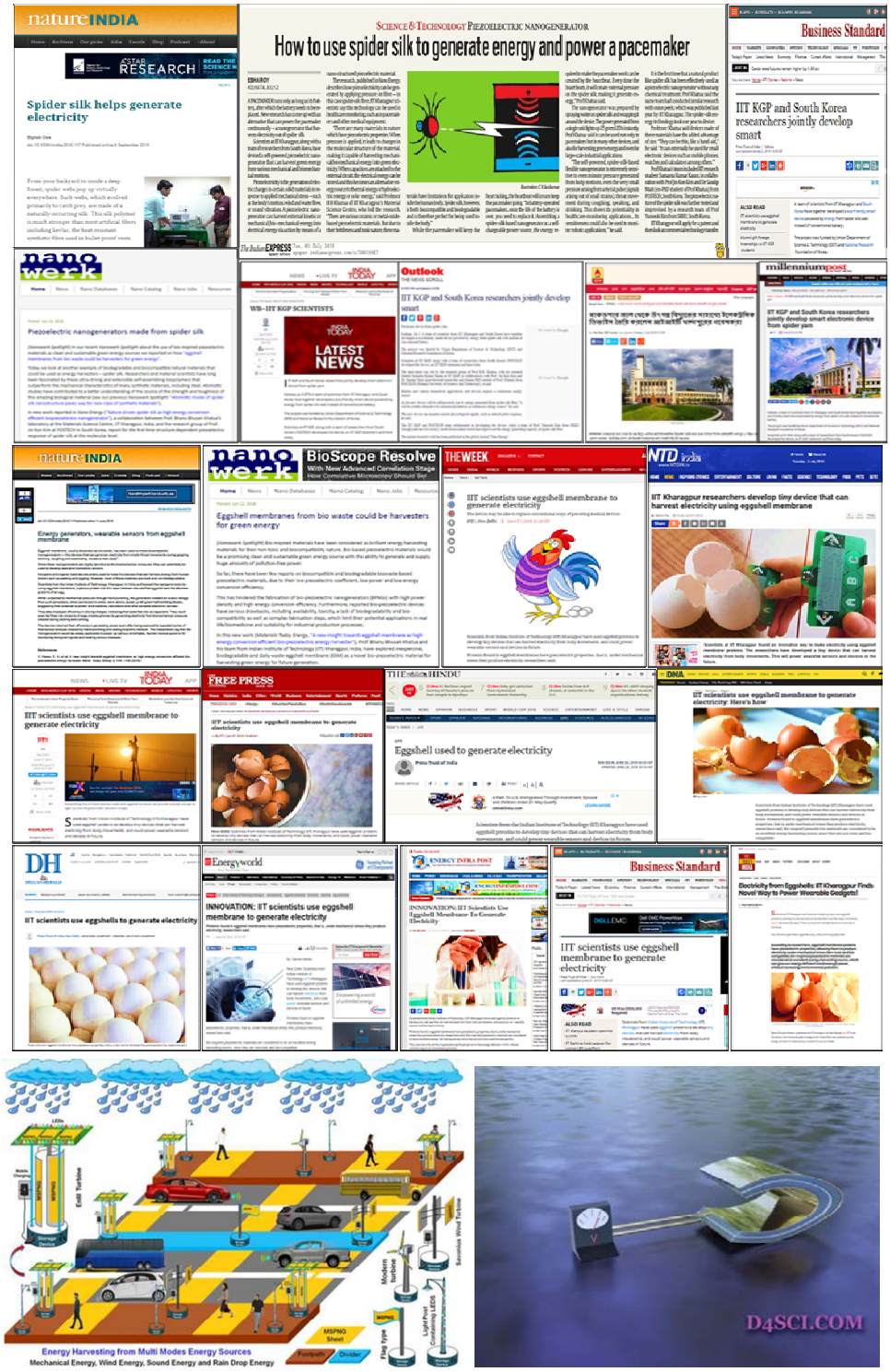
15. Indian, S. Korean team recycles onion peels into nanogenerators. ((Indo-Asian News Service (IANS), ***Business Standard, 2017***)). Link: https://www.business-standard.com/article/news-ians/indian-s-korean-team-recycles-onion-peels-into-nanogenerators-117112100738_1.html
16. IIT scientists use onion skin to generate electricity. (***Press Trust of India, 2017***). Link: http://www.ptinews.com/news/9330598_IIT-scientists-use-onion-skin-to-generate-electricity.html
17. IIT-Kgp turns onion skin into electricity. (***The Times of India, 2017***). Link: https://timesofindia.indiatimes.com/city/kolkata/iit-kgp-turns-onion-skin-into-electricity/articleshow/62102402.cms
18. Bio-waste onion skin as innovative nature-driven piezoelectric material with high energy conversion efficiency. Link: https://advanceseng.com/bio-waste-onion-skin-piezoelectric-material-high-energy-conversion-efficiency/
19. IIT scientist using onion skins to generate electricity. (Bengali popular newspaper ***Anandabazar Patrika, 2018***). Link: https://www.anandabazar.com/others/science/iit-scientist-using-onion-skins-to-generate-electricity-1.734837
20. Electricity-can-be-generated-from-onions. (***Video)*** (***News 18 Bangla*** and ***ETV News Bangla***, 2017). Link: https://bengali.news18.com/videos/electricity-generated-from-onions-160257.html YouTube link: https://www.youtube.com/watch?v=46XOIUAEKWg

PVDF/VB_2 and PVDF/AlO-rGO based Piezoelectric Energy Harvester

21. Polymer Based Piezoelectric Nanogenerators. (***Design of Science, 2016, Japan***). Link: https://d4sci.com/polymer-based-piezoelectric-nanogenerators/
22. Vitamins are good for your multi-energy nanogenerators. (Nanowerk, USA 2019) Link: https://www.nanowerk.com/spotlight/spotid=52238.php
23. Top five most accessed papers: (Advanced Science News, 2016) Link: https://www.advancedsciencenews.com/best-advanced-energy-materials-july/

Screenshot of some highlighted news in various newspapers.





Research Collaboration

1. Christian-Albrechts-University zu Kiel, Germany
2. Pohang University of Science and Technology, South Korea.
3. Sungkyunkwan University, South Korea.
4. Jadavpur University, Kolkata, India.

Journal Publication Details

Sl. No.	*Name of the Journal*	*h-index*	*Impact Factor*	*No. of Publications*
1.	**Advanced Energy Materials**	129	**21.875**	2
2.	**Nano Energy**	85	**13.12**	4
3.	**Journal of Materials Chemistry A**	120	**9.931**	2
4.	**ACS Applied Materials & Interfaces**	143	**8.097**	3
5.	**Nanoscale**	152	**7.233**	1
6.	**Carbon**	229	**7.082**	1
7.	**Chemical Engineering Journal**	154	**6.735**	2
8.	**Macromolecules**	279	**5.914**	1
9.	**Carbohydrate Polymers**	156	**5.158**	1
10.	**Electrochimica Acta**	202	**5.116**	2
11.	**Composites Part B: Engineering**	98	**4.92**	2
12.	**Materials and Design**	108	**4.525**	1
13.	European Polymer Journal	112	3.741	1
14.	Applied Clay Science	101	3.641	1
15.	Materials Science and Engineering: A	192	3.414	1
16.	Journal of Electroanalytical Chemistry	140	3.235	1
17.	Polymer Degradation and Stability	130	3.193	3
18.	Industrial & Engineering Chemistry Research	188	3.141	4
19.	Express Polymer Letters	53	3.064	4
20.	RSC Advances	96	2.936	5
21.	Synthetic Metals	124	2.526	1
22.	Macromolecular Chemistry and Physics	100	2.492	1
23.	Polymer International	91	2.352	2
24.	Journal of Applied Electrochemistry	94	2.262	1
25.	Materials Chemistry and Physics	124	2.210	1
26.	Journal of Thermal Analysis and Calorimetry	74	2.209	1
27.	International Journal of Polymeric Materials and Polymeric Biomaterials	———	2.127	2
28.	Polymer Composites	68	1.943	12
29.	Journal of Applied Polymer Science	142	1.901	17
30.	Macromolecular Research	38	1.767	2
31.	Polymer-Plastics Technology and Engineering	42	1.655	4
32.	Polymer Engineering and Science	97	1.551	2
33.	Journal of Nanoscience and Nanotechnology	93	1.354	6
34.	Journal of Adhesion Science and Technology	57	1.039	2

35.	Journal of Macromolecular Science, Part B, Physics	41	1.005	2
36.	Journal of Elastomers and Plastics	22	0.783	2
37.	Materials Today Energy	5	_____	1
38.	ACS Applied Energy Materials	_____	_____	1
39.	ACS Applied Electronic Materials	_____	_____	1
Total Number of Publications				**103**

List of Publications in International Journals

(* *Indicates corresponding author***)**

Publications: 2019

103. Nature Driven Bio-Piezoelectric/Triboelectric Nanogenerator as Next-Generation Green Energy Harvester for Smart and Pollution Free Society. (***Invited Review***)

Sandip Maiti[†], Sumanta Kumar Karan[†]*, Jin Kon Kim*, Bhanu Bhusan Khatua*. ([†] Co-first author).*

Advanced Energy Materials, Volume 9, Year 2019, 1803027 Pages 1–41. **(IF-21.875)**

102. Designing High Energy Conversion Efficient Bio-inspired Vitamin Assisted Single-Structured based Self-Powered Piezoelectric/Wind/Acoustic Multi-Energy Harvester with Remarkable Power Density.

Sumanta Kumar Karan, Sandip Maiti, Anand Kumar Agrawal, Amit Kmar Das, Anirban Maitra, Sarbaranjan Paria, Aswini Bera, Ranadip Bera, Lopamudra Halder, Avnish Kumar Mishra, Jin Kon Kim, and Bhanu Bhusan Khatua.*

Nano Energy, Volume 59, Year 2019, Pages 169-183. **(IF-13.12)**

101. Triboelectric Nanogenerator Driven Self-Charging and Self-Healing Flexible Asymmetric Supercapacitor Power Cell for Direct Power Generation.

Anirban Maitra, Sarbaranjan Paria†, Sumanta Kumar Karan†, Ranadip Bera, Aswini Bera, Amit Kumar Das, Suman Kumar Si, Lopamudra Halder, Anurima De, Bhanu Bhusan Khatua.*

ACS Applied Materials & Interfaces, volume 9, Year 2019, Pages 5947-5958. **IF-8.09.**

100. A strategy to develop high efficient composite based TENG through dielectric constant, internal resistance optimization, and surface texture modification

Sarbaranjan Paria, Suman Kumar Si, Sumanta Kumar Karan, Amit Kumar Das, Anirban Maitra, Ranadip Bera, Lopamudra Halder, Aswini Bera, Anurima De, Bhanu Bhusan Khatua.*

Journal of Materials Chemistry A, Volume 7, Year 2019, Pages 3979-3991. **IF-9.93.**

99. Fabrication of an Advanced Asymmetric Supercapacitor based on Three-Dimensional Copper-Nickel-Cerium-Cobalt Quaternary Oxide and GNP for Energy Storage Application

Lopamudra Halder, Anirban Maitra, Amit Kumar Das, Ranadip Bera, Sumanta Kumar Karan, Sarbaranjan Paria, Aswini Bera, Suman Kumar Si, Bhanu Bhusan Khatua.

ACS Applied Electronic Materials, 2019, Volume 1, Year 2019, Pages 189–197. **IF- Pending**

98. PVC bead assisted selective dispersion of MWCNT for designing efficient electromagnetic interference shielding PVC/MWCNT nanocomposite with very low percolation threshold

S. Maiti, R. Bera, S. K. Karan, S. Paria, A. De, B. B. Khatua*

Composites Part B: Engineering, Volume 167, Year 2019, Pages 377-386 (**IF-4.92**).

Publications: 2018

97. Nature driven spider silk as high energy conversion efficient bio-piezoelectric nanogenerator.

Sumanta Kumar Karan†, Sandip Maiti†, Owoong Kwon, Sarbaranjan Paria, Anirban Maitra, Suman Kumar Si, Owoong Kwon, Jin Kon Kim, Bhanu Bhusan Khatua*. († Co-first author).*

Nano Energy, Volume 49, Year 2018, Pages 655–666. (**IF-13.12**)

Highlighted worldwide in various scientific/nonscientific newspaper like Nature Asia, Nanowerk, The Indian Express, Business Standard, PTI, IITKGP official website etc. (>100 news sites) and news media (TV channel) such as, Rajya Sabha TV (operated by Rajya Sabha, Govt. of India).

96. High performance advanced asymmetric supercapacitor based on ultrathin and mesoporous $MnCo_2O_{4.5}$-$NiCo_2O_4$ hybrid and iron oxide decorated reduced graphene oxide electrode materials.

Lopamudra Halder, Anirban Maitra, Amit Kumar Das, Ranadip Bera, Sumanta Kumar Karan, Sarbaranjan Paria, Aswini Bera, Suman Kumar Si, Bhanu Bhusan Khatua.*

Electrochimica Acta, Volume 283, Year 2018, Pages 438-447. **(IF-5.116)**

95. Insight into Cigarette Wrapper and Electroactive Polymer Based Efficient TENG as Biomechanical Energy Harvester for Smart Electronic Applications

Sarbaranjan Paria, Ranadip Bera, Sumanta Kumar Karan, Anirban Maitra, Amit Kumar Das, Suman Kumar Si, Lopamudra Halder, Aswini Bera, Bhanu Bhusan Khatua.*

ACS Applied Energy Materials, Year 2018, Volume 1, Pages4963-4975. **(IF- Pending)**

94. A new insight towards eggshell membrane as high energy conversion efficient bio-piezoelectric energy harvester.

Sumanta Kumar Karan, Sandip Maiti, Sarbaranjan Paria, Anirban Maitra, Suman Kumar Si, Jin Kon Kim, Bhanu Bhusan Khatua.*

Materials Today Energy, Volume 9, Year 2018, Pages 114-125. (Under the flagship of "*Materials Today*" which has IF: 21.69). **(IF- Pending)**

Highlighted worldwide in various scientific/nonscientific newspaper like Nature Asia, Nanowerk, The Indian Express, Business Standard, PTI, IITKGP official website etc.

93. A strategy to develop an efficient piezoelectric nanogenerator through ZTO assisted γ-phase nucleation of PVDF in ZTO/PVDF nanocomposite for harvesting bio-mechanical energy and energy storage application.
Suman Kumar Si, Sumanta Kumar Karan, Sarbaranjan Paria, Anirban Maitra, Amit Kumar Das, Ranadip Bera, Aswini Bera, Lopamudra Halder, Bhanu Bhusan Khatua.*
Materials Chemistry and Physics, Volume 213, Year 2018, Pages 525-537. (**IF-2.210**)

92. Temperature dependent substrate-free facile synthesis for hierarchical sunflower-like nickel–copper carbonate hydroxide with superior electrochemical performance for solid state asymmetric supercapacitor.
*Aswini Bera, Amit Kumar Das, Anirban Maitra, Ranadip Bera, Sumanta Kumar Karan, Sarbaranjan Paria, Lopamudra Halder, Suman Kumar Si, Bhanu Bhusan Khatua**
Chemical Engineering Journal, Volume 343, Year 2018, Pages 44–53. (**IF-6.735**)

91. An Approach to Widen the Electromagnetic Shielding Efficiency in PDMS/Ferrous Ferric Oxide Decorated RGO–SWCNH Composite through Pressure Induced Tunability.
*Ranadip Bera, Anirban Maitra, Sarbaranjan Paria, Sumanta Kumar Karan, Amit Kumar Das, Aswini Bera, Suman Kumar Si, Lopamudra Halder, Anurima De, Bhanu Bhusan Khatua**
Chemical Engineering Journal, Volume 335, Year 2018, Pages 501–509. **(IF-6.735)**

Publications: 2017

90. Bio-waste onion skin as an innovative nature-driven piezoelectric material with high energy conversion efficiency.
Sandip Maiti[†], Sumanta Kumar Karan[†], Juhyun Lee, Avnish Kumar Mishra, Bhanu Bhusan Khatua, Jin Kon Kim*. ([†] Co-first author)*
Nano Energy, Volume 42, Year 2017, Pages 282–293. (**IF-13.12**)

Highlighted worldwide in various scientific/nonscientific newspaper like, Nature Asia, Nanowerk, Business Standard, Indo-Asian News Service (IANS), PTI, Times of India, Korean news, etc. (>100 news sites) and different news medias (TV channel etc.) like, DD National (flagship channel of Doordarshan, Govt. of India), News Nation,, ETV News, ABP news and IITKGP official website etc.

89. Fast Charging Self-powered Wearable and Flexible Asymmetric Supercapacitor Power Cell with Fish Swim Bladder as an Efficient Natural Bio-piezoelectric Separator.
Anirban Maitra, Sumanta Kumar Karan, Sarbaranjan Paria, Amit Kumar Das, Ranadip Bera, Lopamudra Halder, Suman Kumar Si, Aswini Bera, Bhanu Bhusan Khatua.
Nano Energy, Volume 40, Year 2017, Pages 633–645. (**IF-13.12**)

88. Fabrication of an advanced asymmetric supercapacitor based on a microcubical PB@MnO2 hybrid and PANI/GNP composite with excellent electrochemical behavior.
*Amit Kumar Das, Ranadip Bera, Anirban Maitra, Sumanta Kumar Karan, Sarbaranjan Paria, Lopamudra Halder, Suman Kumar Si, Aswini Bera, Bhanu Bhusan Khatua**
Journal of Materials Chemistry A, Volume 5(42), Year 2017, Pages 22242–22254. (**IF- 9.931**)

87. Salt leached viable porous Fe3O4 decorated polyaniline–SWCNH/PVDF composite spectacles as an admirable electromagnetic shielding efficiency in extended Ku-band region.

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