Brief Biodata

Name: Dr. Sanjay R. Dhakate

Designation:	**Chief Scientist and Professor Head, Advanced Materials Devices and Metrology**	
DP No. and Name:	**Advanced carbon products and Metrology 4.03**	
DU No. and Name:	**Advanced Materials Devices and Metrology**	
Email:	**dhakate@nplindia.org**	
Date of Joining CSIR-NPL:	**22/06/1992**	
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Research Area/ Interest

Carbon based materials, Carbon-carbon composite, Carbon fibres, carbon nanomaterials, fuel cell, super-capacitor, thermoelectric materials, waste biomass utilization etc.

Educational Qualifications

(Please write latest qualification first)

Degree	Subject	University/ Institute	Year
Ph. D	**Physics**	**The University of Delhi**	**2002**
M.Sc.	**Physics**	**RTM Nagpur University**	**1991**

Academic / Research Experience

Grade / Post	Institute	Duration		Research Field
		From	To	
Junior Scientist	CSIR-National Physical Laboratory	22/06/1992	22/06/1997	Carbon based materials
Scientist	CSIR-National Physical Laboratory	22/06/1997	22/06/2002	Carbon based materials
Training Scientist (JICA fellowship)	Osaka National Research Institute, Osaka, Japan	18/01/1998	17/09/1998	Carbon based materials
Senior Scientist	CSIR-National Physical Laboratory	22/06/2002	22/06/2006	Carbon based materials
Postdoctoral fellowship (JSPS)	National Aerospace Laboratory, Tokyo, Japan	24/11/2002	23/11/2003	Carbon based materials
Principal Scientist	CSIR-National Physical Laboratory	22/06/2006	22/06/2011	Carbon based materials
Sr. Principal Scientist	CSIR-National Physical Laboratory	22/06/2011	22/06/2016	Carbon based materials

Visiting Scientist (JSPS Bridge fellowship)	The University of Tokyo, Tokyo, Japan	01/10/2011	14/11/2016	Carbon based materials
Chief Scientist	CSIR-National Physical Laboratory	22/06/2016	Till date	Carbon based materials

No. of Publications

No. of Publications in SCI Journals	No. of Publications in non-SCI Journals	No. of Publications in Conference Proceedings	Books/ Book chapter	Total
177	25	150	2 +8	362

Selected Publications

1. **S. R. Dhakate**, R. B. Mathur and O.P. Bahl, Catalytic effect of iron oxide during graphitization on carbon-carbon composites, Carbon 35, 12, 1753, 1997.
2. V. Raman, V. K. Parashar, **S.R. Dhakate**, O.P.Bahl and U. .Dhawan, Synthesis of silicon carbide through sol-gel process from rayon fibers.J.Amer.Ceram. Soc.,83,4, 952-54,2000.
3. **S.R. Dhakate**,V. K. Parashar, V.Raman and O.P.Bahl, Effect of titania (TiO_2) interfacial coating on mechanical properties of C-C composites. J. Mater. Sci. Lett.19, 8, 699-701,2000.
4. **S.R. Dhakate**, V. K. Parashar, V. Raman, O.P.Bahl and P. D. Sahare, Influence of ceramic interphase on the mechanical properties of T-300 carbon fiber composites. J.Mater. Sci. Lettr. 19,17, 1575-1577, 2000
5. **S.R. Dhakate**, O.P.Bahl, P.D. Sahare, Oxidation behavior of PAN based carbon fiber reinforced phenolic resin matrix composites, J. Mater. Sci. Lettr. 19, 21,1959-1961,2000
6. **S.R. Dhakate**, V.Raman, T.L.Dhami and O.P.Bahl, Synthesis of MTEOS derived SiC incorporated Carbon-Carbon Composites,J. Mat. Sci. Lettr. 20,9,811-813, 2001
7. **S.R. Dhakate**, R. B. Mathur and T. L. Dhami Mechanical properties of unidirectional carbon-carbon composites as function of fiber volume content,Carbon Science 3,3, 1-6,2002.
8. **S.R. Dhakate**, R. B. Mathur T. L.Dhami S.K. Chuhan, Role of interface on the development of microstructure in carbon-carbon composites, Carbon Science 3, 4,192-97,2002
9. **S.R. Dhakate** and O.P.Bahl, Effect of Carbon Fiber Surface Functional groups on mechanical properties of carbon- carbon composites with HTT, Carbon 41,1193, 2003
10. **S.R. Dhakate**, T. Aoki and T. Ogasawara, Effect of silicon infiltration on the mechanical properties of carbon-carbon composites, Carbon Science 5, 3, 108-112,2004
11. **S.R. Dhakate**, R. B. Mathur and T. L. Dhami, .Development of Vapor grown carbon fiber(VGCF) reinforced Carbon-carbon Composites, J. Mat. Science 41, 4123-31,2006.
12. **S.R. Dhakate**, R.B. Mathur, B.K. Kakati, and T.L. Dhami, Properties of graphite-composite bipolar plate prepared by compression molding technique for PEM fuel cell, Inter J. Hydrogen Energy 32, 4537-4543, 2007
13. **S.R. Dhakate**, S. Sharma, M. Borah, R.B. Mathur and T.L. Dhami, Development and characterization of expanded graphite based nano composite as bipolar plate for polymer electrolyte membrane fuel cells (PEMFCs), Energy & Fuel, 22,5, 3329,2008
14. **S.R. Dhakate**, S. Sharma, M. Borah, R. B. Mathur and T. L. Dhami, Expanded graphite

based electrically conductive composites as bipolar plate for PEM fuel cell, Inter J. Hydrogen Energy 33,23,7146-7152, 2008.

15. **S.R. Dhakate**, R.B. Mathur, S. Sharma, M. Borah and T.L. Dhami, Influence of expanded graphite particle size on the properties of composite bipolar plate for fuel cell application, Energy & Fuel23, 934-941,2009.
16. **S.R. Dhakate**, S. Sharma, N. Chauhan R. R.B. K. Seth and Mathur, CNTs nanostructuring effect on the properties of graphite composite bipolar plate. Int. J. Hydrogen Energy 35,4195-4200, 2010
17. **S.R. Dhakate**, A. Gupta, A. Choudhari, J. Tawale and R.B. Mathur, Morphology and thermal properties of PAN copolymer based electrospun nanofibers, Synthetic Metals 161,411- 419,2011
18. 33.N.V. S. Vallabani, S. Mittal, R. K. Shyula, A.K Pandey, **S.R.Dhakate**, Renu Pasricha, Alok Dhawan, Toxicity of Graphene in normal human lung cells (BEAS-2B), J. of Biomed. Nanotechnol. 7, 106-07, 2011
19. **S.R. Dhakate**, N.Chauhan, S.Sharma, J.Tawale, S.Singh, P.D.Sahare, R.B. Mathur, A new approach to produce single and double layer graphene from re-exfoliation of expanded graphite, Carbon 49,1946-1954, 2011.
20. **S.R. Dhakate**., N.Chauhan, S, Sharma, R.B.Mathur, The production of multi-layer graphene nanoribbons from thermally reduced unzipped multi-walled carbon nanotubes, Carbon Vol.49, 4170-4178, 2011.
21. S.Sinha, **S.R. Dhakate**, Pankaj Kumar, R.B. Mathur, P.Tripathi, S.Chand, Electrospun polyacrylonitrile nanofibrous membranes for chitosanase immobilization and its application in selective production of hitooligosaccharide, Bioresource Tech. 115,152-157, 2012
22. Ashish Gupta**, S.R. Dhakate**, ManshiPahawa, S. Sinha, R.B. Mathur, Subhash Chand, Improved ester synthesis by immobilizing Thermomycelanuginosus lipase (TLL) on electrospun nanofiber membrane. Process Biochemistry 48, 124-132,2013
23. Rajeev Kumar, **S. R. Dhakate,** Parveen Saini, R.B. Mathur, Improved electromagnetic interference shielding effectiveness of light weight carbon foam by ferrocene accumulation, **RSC Adv., 3**, 4145-4151,2013.
24. Rajeev Kumar, **S. R. Dhakate**,Tejender Gupta, Parveen Saini, Bhanu P. Singh and Rakesh B.Mathur, Effective improvement of properties of the light weight carbon foam region by decoration with multi-wall carbon nanotubes, Mat. Chemistry A, 1, 5727-5735, 2013.
25. A. Sharma, A. Gupta, G.Rath, A. Goyal, R.B. Mathur**, S.R. Dhakate**, Electrospun composite nanofibers based transmucosal patch for anti-diabetic drug delivery, Materials Chemistry B,**1**,3410-3418,2013
26. Tejendra Gupta, B.P. Singh, **S.R. Dhakate** ,V.N. Singh, R.B. Mathur, Improved Nano indentation and Microwave Shielding Properties of Modified MWCNT Reinforced Polyurethane Composites **J.** Mater. Chem. A, 2013,**1**, 9138-9149
27. Tejendra Gupta, B.P. Singh, R.B. Mathur and **S.R. Dhakate**, Multi-walled carbon nanotube- graphene-polyaniline multiphase nanocomposite with superior electromagnetic shielding effectiveness**,** Nanoscale 6, 842-851, 2014.
28. T. K. Gupta, B. P. Singh, V. N. Singh, S. Teotia, A. P. Singh, I. Elizabeth, **S.R. Dhakate**, S.K. Dhawan and R. B. Mathur, MnO_2 decorated graphene nanoribbons with superior permittivity and excellent microwave shielding properties, J. Mater. Chem**. A,** 2,4256-4263,2014
29. Karun Kataria, A. Gupta, G.Rath, R.B. Mathur, **S. R. Dhakate** In-vivo wound healing performance of drug loaded electrospun composite nanofibers transdermal patch, Int. J. Pharmaceutics 469, 1, 102–110. 2014
30. A.K. Kesarwani, O.S. Panwar, S. Chockalingam, A.Bisht**, S.R. Dhakate**, B.P. Singh, A.K. Srivastava, R.K. Rakshit, Graphene synthesized from solid carbon source using filtered cathodic vacuum arc technique for transparent conducting and filed effect transistor devices. Science of Advanced Materials 6(10),21240-2133,2014
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Chitosan-Polyvinyl alcohol composite nanofibers loaded with Cerium for efficient removal of Arsenic from contaminated water, Journal Materials Chemistry A. **2**, 16669-16677,2014 .

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46. Sipra Jain, Joyti Shah, **S. R. Dhakate**, Govind Gupta, C. Sharma, R.K. Kotnala, Environment friendly mesoporous magnetite nanoparticles based hydroelectric cell, *J. Physical Chemistry C*,122 (11), 5908–5916,2018.
47. Sushant Sharma, Abhishek Pathak, Vidya Nand Singh, Satish Teotia, **S.R. Dhakate**, B.P. Singh, Excellent mechanical properties of long length multiwalled carbon nanotube bridged Kevlar fabric, Carbon 137,104-117,2018
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Singh, K. Srivastava, **Sanjay R Dhakate**, B. K. Gupta, Highly luminescent dual mode Polymeric nanofibers based flexible mat for white security paper and encrypted nanotaggants applications, Chemistry A European Journal24 (38), 9477-9484,2018

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50. Sushant Sharma , Vipin Kumar , Abhishek K. Pathak , Tomohiro Yokozeki, Shailesh Kumar Yadav **,**Vidya Nand Singh **,S. R. Dhakate** and Bhanu Pratap Singh**,** Designing of MWCNT bucky paper reinforced PANI-DBSA-DVB composites for superior electrical and mechanical Properties, J. Mater. Chem. C, **6**, 12396-12406,2018.
51. Pinki Agrawal, Rajeev Kumar,SatishTeotia, Saroj Kumari, D.P. Mondal, **Sanjay Dhakate,** Lightweight, high electrical and thermal conducting carbon-rGO composites foam for superior electromagnetic interference shielding, Composites Part B: Engineering 160, 131-139,2019 .
52. Abhishek K Pathak, Vipin Kumar, Sushant Sharma, Tomohiro Yokozeki, **S.R. Dhakate**, Improved thermomechanical and electrical properties of reduced graphene oxide reinforced polyaniline- dodecylbenzenesulfonic acid/divinylbenzene, Journal of Colloid And Interface Science 533,548-560,2019
53. Vipin Kumar, Sushant Sharma, Abhishek Pathak, Bhanu P. Singh, **S.R. Dhakate**, Tomohiro Yokozeki, Toshio Ogasawara, Interleaved MWCNT bucky paper between CFRP laminates to improve through-thickness electrical conductivity and reducing lightning strike damage,Composite Structure 210,581-589,2019.
54. Ruchi Bhardwaj, Bhasker Gahtori,; Kishore Johari, Sivaiah Bathula, N.S. Chauhan, Avinash Vishwakarma ,**Sanjay Dhakate**, Sushil Auluck, Ajay Dhar, Collective effect of Fe and Se to improve the thermoelectric performance of unfilled p-type $CoSb_3$ Skutterudites, *ACS Appl. Energy Mater.*, *2* (2), 1067–1076,2019 .
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56. S. Waseem, P.H. Maheshwari, S. Abinaya, A.K. Sahu, A Saini, **S.R. Dhakate**, Effect of Matrix Content on the Performance of Carbon Paper as an Electrode for PEMFC, Inter. J. of Energy Research 43:2897–2909,2019.
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58. Ravi Kumar, Dilip Singh, Prashant Kumar, Raj Kumar; **Sanjay Dhakate**, Influence of degree of air oxidation on ensemble emission from nitrogen vacancy centers in Nano-diamonds, Diamond like materials 97,107431,2019.
59. Pinki Rani Agrawal, Nahar Singh, Saroj Kumari and **S. R. Dhakate** ,The removal of pentavalent arsenic by graphite intercalation compound functionalized carbon foam from contaminated water,Journal of Hazardous Materials 377,274-283,2019.
60. Sushant Sharma, **Sanjay R Dhakate**, Abhijit Majumdar, Bhanu P.Singh, Improved static and dynamic mechanical properties of multiscale bucky paper interleaved kevlar fiber composites by tailored-epoxy, Carbon 152, 631-642,2019.
61. Ashish Gupta ,P. Gurunathan, K. Ramesha ,M. Singh, **S. R. Dhakate**, Effect of heat treatment temperature on energy storage performance of PAN co-MMA based carbon nanofibers as freestanding lithium ion batteries anode, Energy Storage, e89,1-13,2019
62. Meetu Bharti, Bhanu P Singh, **Sanjay R Dhakate**, Gajender Saini, Shovit Bhattacharya, A K Debnath, K P Muthe, D, K, Aswal**,** Free-standing flexible MWCNTs forest for wearable thermoelectric power generator, J. Power Sources 449, 227493,2020.
63. Sanjeev Kumar, Garima Jain, B. P. Singh, **S. R. Dhakate**, Tunable photoluminescence of polyvinyl alcohol electrospun nanofibers by doping of $NaYF_4:Eu^{+3}$ Nanophosphor, Journal of Nanomaterials 1023589, 8pages,2020.
64. Sushantika Choudhary, Saravanan Muthiah, **S.R. Dhakate**, Process optimisation

enhancing thermoelectric and mechanical performance in reactive in-situ spark plasma sintered Mg2(Si,Sn),Materials Research Bulletin 128, 110875,2020

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66. Saroj Kumari, Pinki Agrawal, Rejeev Kumar, Shiv Prakash,**S.R. Dhakate**, Fabrication of light weight and porous silicon carbide foam as excellent microwave susceptor for heat generation, Journal of Material physics and chemistry253, 123211,2020.
67. Sushant Sharma, Jishu Rawal, **S. R. Dhakate**, B.P. Singh, Synergistic bridging effects of graphene oxide and carbon nanotube on mechanical propertie of kevlar reinforced polycarbonate composite tape, Composite Science&Technology199, 108370,2020.
68. P. Dariyal**,** Abhishek K. Arya, B. P. Singh, **S. R. Dhakate**, A review on conducting carbon nanotube fibers spun via Direct spinning technique, Material Science 56, 1087–1115,2021
69. Avinash Vishwakarma, Nagendra S. Chauhan, Ruchi Bhardwaj, Kishor Kumar Johari, **Sanjay R. Dhakate**, Bhasker Gahtoriand Sivaiah Bathula, Melt-Spun SiGe Nano-alloys: Microstructural Engineering towards High Thermoelectric, Journal Electronic Materials 50, No. 1, 2021-364-37.
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71. Wassem Sdiya, P.H. Haheshawari,, Nithy Chandrasekaran, **S.R. Dhakate,** Carbon Paper as a promising free standing Anode for Sodium ion Batteries, J. Electrochem. Soc. 167, 160538 ,2020
72. Sukanta Das, Sushant Sharma, Tomohiro Yokozeki, and **Sanjay Dhakate,** Conductive Layer-based Multifunctional Structural Composites for Electromagnetic Interference Shielding , Composite structure 261, 2021, 113293
73. Ravi Kumar, Dilip K. Singh, Prashant Kumar, Cong T. Trinh, K.-G. Lee, Raj Kumar, **S.R. Dhakate**, High ensemble concentration of photo-stable NV centers in Type Ib nanodiamonds bythermal assisted migration of native vacancies, Diamond related materials114,April 2021, 108337
74. Kishor Johari, Ruchi Bhardwaj, Nagendra Chauhan, Sivaiah Bathula , Sushil Auluck, **Sanjay Dhakate**, Bhasker Galhoti, High thermoelectric performance in n-type degenerate ZrNiSn-based half-Heusler alloys driven by enhanced weighted mobility and lattice anharmonicity, ACS Applied Energy Materials 2021, 4, 4, 3393–3403
75. Mandeep Singh, Ashish Gupta, Shashank Sundriyal, Karishma Jain, **S.R. Dhakate**, Kraft lignin- derived free-standing carbon nanofibers mat for high-performance all-solid-state supercapacitor, J Materials Chemistry and Physics 264, 1 May 2021, 124454
76. Shashank Sundriyal , Vishal Shrivastav, Ashish Gupta , Vaishali Shrivastav, Akash Deep, **Sanjay R. Dhakate**,Pencil Peel Derived Mixed Phase Activated Carbon and Metal Organic Framework Derived Cobalt-Tungsten Oxide for High Performance Hybrid Supercapacitors, Material Research Bulletin 142, October 2021, 111396
78. Mandeep Singh, Ashish Gupta, Kushagra Yadav, Karishma Jain, Preeti Shrivastava, R.K. Seth, Amit Kulshreshtha, **S.R. Dhakate**,Co-combustion properties of torrefied rice straw-sub-bituminous coal blend and its Hardgrove grindability index Biomass Conversion and Biorefinery 2021
79. S. Prakash, Ravi Kumar, Pankaj Kumar, Sonu Rani, Khushboo Kumari, Saroj Kumari, **S. R. Dhakate**,Reticulated porous carbon foam with cobalt oxide nanoparticles for excellent oxygen evolution reaction, Materials Chemistry and Physics 275,125131,2022
80. S. K. Yadav, **S.R. Dhakate**, Bhanu Pratap Singh, Carbon Nanotube Incorporated Eucalyptus Derived Activated Carbon-Based Novel Adsorbent for Efficient Removal of Methylene Blue and Eosin Yellow Dyes, Biores.Technology, 344, Part B, 2022, 126231

Patents

1. An improved process for the preparation multi-component graphite composite bipolar plates for fuel cell, R.B. Mathur, S.R. Dhakate, S. Sharma, and T.L. Dhami, Indian Patent No.351261 Nov.10, 2020
2. Light weight carbon foam as electromagnetic interference (EMI) shielding and thermal interface material, S.R. Dhakate, R. Kumar, R.B. Mathur, P.K. Saini,US 2015/030521 A1
3. Transmucosal delivery of insulin using polymeric nanofibers, Abhinandan Sharma, G. Rath, Amit Goyal, S.R. Dhakate (DEL-2574/2012)
4. Polyvinyl alcohol carbon nanofiber manufactured at high yield and low cost by electro-spinning methods, S.R. Dhakate, Ashish Gupta, Anisha Chaudhary, R.B. Mathur, JP2015-155973
5. High performance light weight carbon fiber fabric -electrospun carbon nanofibers hybrid polymer composites, S.R. Dhakate, Anisha Chaudhary, Ashish Gupta, R.B. Mathur, US 10,357,939,B2
6. A new approach for the development of high strength carbon fiber/carbon nanotubes reinforced polymer nanocomposites, B.P. Singh, Satish Teotia, S.R. Dhakate (US 20180112046) 2018.
7. High temperature graphite-phenolic resin composite bipolar plates for fuel cell applications, by Harshawardhan Pol, Sanjay Dhakate, Vivek Borkar, Sandeep Inamdar, INV-2018-0023
8. A process for preparation of dimensionally stable particle board from rice husk using novel adhesive By P. H. Maheshwari, Sadiya Waseem, S. Swaroopa Tripathi , Sanjay R. Dhakate, NPL- 2019
9. A process for the recycling of Multi-layered plastics and converting into granules and tiles for societal applications. K. Dhawan, Rajiv Singh, Ridham Dhawan, Maheh Kumar, Rajesh Seth, S.R. Dhakate, D. K. Aswal

Current Activities

(Not more than 100 words)

Currently working in the area of hydrogen utilization in fuel cell for generation of clean energy, conversion waste biomass on to biochar as useful energy source in the thermal power plant, Energy storage devices such as super capacitor, thermoelectric materials, Pitch based carbon fibres, electrospun nanofibers, Carbon nanotubes, Carbon foam, Graphene and its derivatives, carbon fiber polymer composites, self heeling polymers, conducting polymers etc.

Honour(s)/Award(s)/ Fellowship(s)

1. JICA Fellowship award of Japan 1998
2. JSPS Fellowship award of Japan 2002
3. Advanced Materials Letters Scientist award 2010, for recognition of work in material

science given in International conference on advanced Materials held in Jinan, China
4. JSPS Bridge Fellowship award of Japan
5. Visiting Fellow, Queensland University of Technology, Brisbane, Australia
6. Best poster paper award given by Material Research Society of India during IUMRS-ICA 2013, IISc Bangalore
7. B.D. Bangur Award 2015 given by India Carbon Society for recognition of work in the area of Carbon Material

Contributions to AcSIR

Chairman Academic Committee of AcSIR, Ph.D. supervision of AcSIR students

Membership of Professional Societies/ Institutions

1. Member Steering Committee of Versailles Project on Advanced Materials and Standards (VAMAS): Representing India
2. Member, Physics board of studies, RTM Nagpur University
3. Member, Metallurgical committee of Bureau of India standards
4. Life member of Material Research Society of India
5. Life member of JICA Alumni Association of India
6. Life member of Indian JSPS Fellow Alumni Association
7. Life member of International Association of Advanced Materials
8. Life member of Metrology Society of India
9. Vice president of Indian Carbon Society

Any other Information

(Not more than 100 words)

Looking the activities of Photonic materials, photovoltaic materials including the Primary standard establishment solar cell calibration. Also we are in the process of establishing centre of excellence in additive manufacturing for development of standard.