

## Curriculum vitae

### **Dr. Anjan Sil**

Professor (HAG)  
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He obtained M.Tech. (Materials Technology) and Ph.D. degrees from Banaras Hindu University.

He has over 30 years of teaching experience.

Taught the following undergraduate / postgraduate level courses: (1) Electrical and Electronic Materials, (2) Engineering Polymers and Composites, (3) Energy Storage Materials, (4) Ceramics and Metal Powder Processing, (5) Microsensor, MEMS and Smart Devices, (6) Materials for Renewable Energy, (7) Electro Ceramics, (8) Electronic and Magnetic Materials, (9) Composites and Polymers, (10) Polymers and Elastomers, (11) Ceramic Materials

He has over 36 years of research experience (in Materials Engineering with specialization in Energy Storage Materials and Functional Ceramics).

Ph.D. Supervision: 22 (Awarded = 16 and Ongoing = 6)

M. Tech. thesis supervised: 24

### **Doctoral (Ph.D.) thesis supervision**

Sl. No.	Title of thesis	Year	Name of Student or Scholar	Supervised (Singly/ Jointly)
1.	Microstructural and electrical investigations on ZnO varistors with SiO <sub>2</sub> additive as grain growth inhibitor	Awarded 2002	Mrs Roopa	Jointly
2.	Ion transport properties of some mixed halide based oxide dispersed composite electrolyte systems	Awarded 2005	Mrs Archana Gupta	Jointly
3.	Development of anodized Al-oxide with CNT/CNF in nanopores and its tribological behaviour	Awarded 2009	Mr Manoj Kumar Kushwaha	Jointly
4.	Investigations on cathode materials for lithium ion battery	Awarded 2009	Mr Gurpreet Singh	Jointly
5.	Synthesis and characterization of anode materials for lithium ion battery	Awarded 2011	Mr Kuldeep Singh Rana	Singly

6.	Stabilization of cubic spinel Li-Mn-O by dopants as cathode material in Li-ion battery	Awarded 2010	Ms Priti Singh	Jointly
7.	Oxide dispersed ceramic composites – their fracture toughness and hardness characteristics	Awarded 2011	Mr Kuntal Maiti	Singly
8.	Characterisation and mechanical properties of thermally sprayed ceramic coatings	Awarded 2011	Mr Vinay Pratap Singh	Jointly
9.	Carbon nanostructures-development and application in the anode of Li-ion battery	Awarded 2013	Mr Malay Jana	Jointly
10.	Polymer based nanocomposite electrolytes for Li-ion batteries	Awarded 2015	Mrs Rajni Sharma	Jointly
11.	Synthesis and characterization of LiFePO <sub>4</sub> /C - polymer cathode material for Li-ion battery	Awarded 2016	Mr Rajeev Sehrawat	Singly
12.	Silicon based nano-structures as a cathode material for lithium ion batteries	Awarded 2017	Preana Chaturvedi	Jointly
13.	Lithium ion battery- supercapacitor hybrid using biomaterial electrodes	Awarded 2018	Mr Sobhit Saxena	Singly
14.	Synthesis and characterization of La <sub>2</sub> Mo <sub>2</sub> O <sub>9</sub> -based electrolytes for solid oxide fuel cell	Awarded 2020	Siddharth	Jointly
15.	LiFePO <sub>4</sub> based composite electrodes for Li-ion battery application	Awarded 2020	Hari Raj	Singly
16.	Energy storage ceramics: synthesis and characterization	Awarded 2020	Abhishek Kumar Gupta	Singly
17.	Rechargeable Li-S batteries: investigation on cathode and electrolyte	In progress	Ayush Chandra Pundir	Singly
18.	Biomass derived anode material for sodium ion battery: effects of structure, processing temperature and doping	In progress	Bharat Verma	Singly
19.	Investigation on solid electrolytes for rechargeable batteries	In progress	Basitti Hitesh	Singly
20.	All solid state batteries	In progress	Harsha Rajput	Singly
21.	Damping and creep behaviour of polyurethane based polymer composites	In progress	Tayade Nitamkumar Gautam	Singly
22.	Cathode materials for sodium ion batteries	In progress	Himanshu Shukla	Singly

## Mentored post-doctoral fellow for two terms

Publications: Research Papers: 94 (in reviewed journals), 86 (International / National Conference Presentations), Patents : Granted = 2, Filed = 6, Book chapter = 1.

## Research Publications in Journals

1. "Photo-response of Fe-doped ZnO electron transport interlayer on Poly(3-hexylthiophene-2,5-diyl): Phenyl-C61-butyric acid methyl ester based thin film device for photodiode application," S.S. Ghosh, Anjan Sil, Thin Solid Films 756 (2022) 139358.
2. "Effect of microwave processing on Mn doped ZnO diluted magnetic semiconductor characteristics," S.S. Ghosh, Anjan Sil, Materials Today Communications 32 (2022) 103941.
3. "Dielectric and energy storage characteristics of 0.2, 0.4, 0.6, 0.8 wt% Cr<sub>2</sub>O<sub>3</sub> doped PbZr<sub>0.52</sub>Ti<sub>0.48</sub>O<sub>3</sub> ceramics synthesized by spark plasma sintering," Abhishek Kumar Gupta, Anjan Sil, Materials Science & Engineering B 281 (2022) 115738.
4. "Porous alumina thermophotovoltaic film for output voltage enhancement of silicon solar cell at room temperature," S.S. Ghosh, Anjan Sil, Optical Materials, 123 (2022) 111844.
5. "Aqueous processing based novel composite electrode for Li-ion batteries using an environmentally benign binder," Hari Raj, Anjan Sil, Ceramics International, 47 (2021) 34639 - 34647.
6. "Compatibility study of La<sub>2</sub>NiO<sub>4+δ</sub> and La<sub>2</sub>Mo<sub>1.5</sub>W<sub>0.5</sub>O<sub>9</sub> as electrode-electrolyte material for solid oxide fuel cell," Siddharth Singh, Anjan Sil, Sandip Bysakh, Journal of Electron Spectroscopy and Related Phenomena, 250 (2021) 147087.
7. "In-situ-grown hierarchical mesoporous Li<sub>3</sub>VO<sub>4</sub> on GO as a viable anode material for lithium ion batteries," Nishant Gautam, Vijay Alwera, Raeesh Muhammad, Hari Raj, Megha Goyal, Anjan Sil, Paritosh Mohanty and Tapas Kumar Mandal, Bull Mater Sci (2020) 43:292.
8. "Two-Phase Composition (LiFePO<sub>4</sub>/FePO<sub>4</sub>) and Phase Transformation Dependence on Charging Current: In Situ and Ex Situ Studies," Hari Raj, Sonia Rani and Anjan Sil, Energy Fuels 2020, 34, 14874–14881, ACS Publications.
9. "Effect of sintering temperature on spark plasma sintered PbZr<sub>0.52</sub>Ti<sub>0.48</sub>O<sub>3</sub>: Impedance and energy storage analysis," Abhishek Kumar Gupta, Anjan Sil, Physica B 601 (2021) 412641.
10. "Energy and power densities of novel composite electrode driven by synergy of poly(3,4-ethylene dioxythiophene):poly(styrene sulfonate) and single walled carbon nanotubes for lithium-ion battery," Hari Raj and Anjan Sil, Journal of Power Sources 458 (2020) 228052.
11. "Phase composition and dielectric properties of spark plasma sintered PbZr<sub>0.52</sub>Ti<sub>0.48</sub>O<sub>3</sub>," Abhishek Kumar Gupta and Anjan Sil, Mater. Res. Express 7 (2020) 036301.
12. "TiO<sub>2</sub> shielded Si nano-composite anode for high energy Li-ion batteries: the morphological and structural study of electrodes after charge-discharge process," Hari Raj, Anjan Sil and Siddharth, Electrochimica Acta 326 (2019) 134981.
13. "Multimodal mesopore hierarchy in Li<sub>3</sub>VO<sub>4</sub> boosts electrochemical anode performance of lithium-ion batteries," Nishant Gautam, Raeesh Muhammad, Hari Raj, Anjan Sil, Paritosh Mohanty and Tapas Kumar Mandal, Microporous and Mesoporous Materials 290 December (2019) 109669.

14. "PEDOT:PSS coating on pristine and carbon coated LiFePO<sub>4</sub> by one-step process: the study of electrochemical performance," Hari Raj; Anjan Sil, Journal of Materials Science: Materials in Electronics (2019) 30 : 13604-13616.
15. "MnO anchored reduced graphene oxide nano composite for high energy applications of Li-ion batteries: The insight of charge-discharge process," H Raj, A Sil, NV Pulagara, Ceramics International, 2019.
16. "Effect of K doping on Mo<sup>6+</sup> stability and ionic conductivity study in La<sub>2</sub>Mo<sub>2</sub>O<sub>9</sub> as oxide-ion conductor," Siddharth, A Sil, S Bysakh, Materials Research Express 6 (5), 056203, 2019.
17. "Photocatalytic response of Fe, Co, Ni doped ZnO based diluted magnetic semiconductors for spintronics applications." SS Ghosh, C Choubey, A Sil, Superlattices and Microstructures 125, 271-280, 1, 2019.
18. "Effect of grain boundary and Ar-H<sub>2</sub> atmosphere on electrical conductivity of bulk a-La<sub>2</sub>Mo<sub>2</sub>O<sub>9</sub> studied by impedance and x-ray photoelectron spectroscopy," A Sil, S Bysakh, Materials Research Express 6 (3), 035505, 2018.
19. "Antisite Defects in Sol-Gel-Synthesized LiFePO<sub>4</sub> at Higher Temperature: Effect on Lithium-Ion Diffusion," H Raj, S Rani, A Sil, ChemElectroChem 5 (22), 3525-3532, 1, (2018).
20. "Crystal structure of the thortveitite-related M phase, (Mn<sub>x</sub>Zn<sub>1-x</sub>)<sub>2</sub>V<sub>2</sub>O<sub>7</sub> (0.75 < x < 0.913): a combined synchrotron powder and single-crystal X-ray study," KM Knowles, A Sil, B Stöger, M Weil, Acta Crystallographica Section C: Structural Chemistry 74 (10), (2018).
21. "X-ray photoelectron spectroscopy and ion dynamics study of W<sup>6+</sup> doped La<sub>2</sub>Mo<sub>2</sub>O<sub>9</sub> as SOFC electrolyte," S Bysakh, A Sil, Materials Research Bulletin 105, 36-44, (2018).
22. "Effect of carbon coating on electrochemical performance of LiFePO<sub>4</sub> cathode material for Li-ion battery," H Raj, A Sil, Ionics 24 (9), 2543-2553 5 (2018).
23. "Preparation of Fe doped ZnO thin films and their structural, magnetic, electrical characterization," PL Hadimani, SS Ghosh, A Sil, Superlattices and Microstructures 120, 199-208 2 (2018).
24. "Enhancement of photoresponse property of perovskite solar cell by aluminium chloride (AlCl<sub>3</sub>)," SS Ghosh, A Sil, Semiconductor Science and Technology 33 (5), 055002 (2018).
25. "Role of calcination atmosphere in vanadium doped Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub> for lithium ion battery anode material," S Saxena, A Sil, Materials Research Bulletin 96, 449-457 7 (2017).
26. "Sol-gel preparation of Zn-V-Mn-O thin films for low voltage varistor applications," A Sil, A Kiran, AP Niranjana, KM Knowles, Ceramics International 43 (13), 9616-9621 3 (2017).
27. "Improved electrochemical performance of Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub> by reducing rutile TiO<sub>2</sub> phase impurity and particle size," H Raj, S Saxena, A Sil, Materials Technology 32 (3), 196-201 8 (2017).
28. "Chemical nature of catalysts of oxide nanoparticles in environment prevailing during growth of carbon nanostructures by CCVD," M Jana, A Sil, S Ray, Bulletin of Materials Science 39 (7), 1783-1790 2 (2016).
29. "Synthesis and transport properties of nanostructured lithium manganese silicate (Li<sub>2</sub>MnSiO<sub>4</sub>) as Li-ion battery cathode material," P Chaturvedi, A Sil, Y Sharma, Solid State Ionics 297, 68-76 2 (2016).
30. "Poly(methyl methacrylate) based nanocomposite gel polymer electrolytes with enhanced safety and performance," R Sharma, A Sil, S Ray, Journal of Polymer Research 23 (9), 194 4 (2016).

31. "Energy storage performance of hybrid aqueous supercapacitor based on nano- $\text{Li}_2\text{MnSiO}_4$  and activated carbon," P Chaturvedi, A Sil, Y Sharma, *Ionics* 22 (9), 1719-1728 5 (2016).
32. "Effect of carbon nanotube dispersion on electrochemical and mechanical characteristics of poly (methyl methacrylate)-based gel polymer electrolytes," R Sharma, A Sil, S Ray, *Polymer Composites* 37 (6), 1936-1944 4(2016)
33. "Energy storage performance of urea combustion derived nanocrystalline- $\text{Li}_2\text{MnSiO}_4$  as a novel electrode material for symmetric supercapacitor," P Chaturvedi, A Sil, Y Sharma, *AIP Conference Proceedings* 1731 (1), 050058 1(2016)
34. "Nanoporous  $\text{Li}_4\text{Ti}_5\text{O}_{12}$  Material for the Electrode of Lithium Ion Battery," S Saxena, A Sil, *IETE Technical Review* 33 (1), 60-63 1 (2016)
35. "Crystal structure of {6, 6'-dibenzoyl-4, 4'-di-tert-butyl-2, 2'-[(ethane-1, 2-diyl) dinitrilobis (phenylmethanylylidene)] diphenolato- $\kappa$ 4O1, N, N', O1} nickel (II), AK Gupta, RJ Butcher, A Sil, *Acta Crystallographica Section E: Crystallographic Communications* 71 (12 ...2015
36. "Atmospheric oxidation effect of silicon-carbon nanotube anode on Li-ion battery performance S Chouksey, A Sil, D Lahiri, I Lahiri, *Nanomaterials and Energy* 4 (2), 153-158 1 (2015)
37. "Carbon Nanofibers Reinforced P (VdF-HFP) Based Gel Polymer Electrolyte for Lithium-Ion Battery Application, A Sil, R Sharma, S Ray, *World Academy of Science, Engineering and Technology, International Journal* 9, 181 - 184 (2015)
38. "Effect of solvents on electrochemical performance of polypyrrole coated  $\text{LiFePO}_4/\text{C}$  cathode materials for Li-ion battery, R Sehrawat, A Sil, *Journal of Materials Science: Materials in Electronics* 26 (7), 5175-5185 6 (2015)
39. "Mechanical and thermal characteristics of PMMA-based nanocomposite gel polymer electrolytes with CNFs dispersion," A Sil, R Sharma, S Ray, *Surface and Coatings Technology* 271, 201-206 13 (2015)
40. "Polymer gel combustion synthesis of  $\text{LiFePO}_4/\text{C}$  composite as cathode material for Li-ion battery," R Sehrawat, A Sil, *Ionics* 21 (3), 673-685 6 (2015)
41. "Cost effective urea combustion derived mesoporous- $\text{Li}_2\text{MnSiO}_4$  as a novel material for supercapacitors, P Chaturvedi, A Kumar, A Sil, Y Sharma, *RSC Advances* 5 (32), 25156-25163 6 (2015)
42. "Internal Hybrid System of Li-Ion Battery and Supercapacitor," H Raj, S Saxena, A Sil, *Journal of Basic and Applied Engineering Research* 2 (11), 937-940 1 (2015)
43. "Growth and morphology of carbon nanostructures on nickel oxide nanoparticles in catalytic chemical vapor deposition," M Jana, A Sil, S Ray, *Applied Physics A* 117 (3), 1425-1436 3 (2014)
44. "Evaluation of dry sliding and slurry erosion behaviour of plasma sprayed nanostructured  $\text{Cr}_2\text{O}_3$ -3% $\text{TiO}_2$  coatings," VP Singh, A Sil, R Jayaganthan, *Tribology-Materials, Surfaces & Interfaces* 8 (3), 131-138 (2014)
45. "Morphology of carbon nanostructures and their electrochemical performance for lithium ion battery," M Jana, A Sil, S Ray, *Journal of physics and chemistry of Solids* 75 (1), 60-67 13 (2014)
46. "Ball-Milled Graphite-Tin Composite Anode Materials for Lithium-Ion Battery," K Rana, A Sil, S Ray, *Materials Science Forum* 736, 127-132 (2013)

47. "Characterization of individual layers of an optical design based multilayered antireflection coating developed by sol-gel method," S S Ghosh, S Das, A Sil and P K Biswas, *J Sol-Gel Sci Technol* 64 : 534 – 542 (2012)
48. "Growth of carbon nanostructures in catalytic chemical vapour deposition method," M Jana, A Sil, S Ray, *The Banaras Metallurgist*, 17 01 – 16 (2012)
49. "Tribological behaviour of nanostructured Al<sub>2</sub>O<sub>3</sub> coatings," VP Singh, A Sil, R Jayaganthan, *Surface Engineering* 28 (4), 277-284 21 (2012)
50. "Wear of Plasma Sprayed Conventional and Nanostructured Al<sub>2</sub>O<sub>3</sub> and Cr<sub>2</sub>O<sub>3</sub>, Based Coatings," VP Singh, A Sil, R Jayaganthan, *Transactions of the Indian Institute of Metals* 65 (1), 1-12 8 (2012)
51. "Influence of melting of transition metal oxides on the morphology of carbon nanostructures," M Jana, A Sil, S Ray, *Advanced Materials Research* 585, 159-163 1 (2012)
52. "Characterization of plasticized PMMA-LiClO<sub>4</sub> solid polymer electrolytes," R Sharma, A Sil, S Ray, *Advanced Materials Research* 585, 185-189 3 (2012)
53. "Synthesis and Characterization of LiFePO<sub>4</sub>-C/PANI Composite for Cathode Material of Lithium Ion Battery," R Sehrawat, A Sil, *Advanced Materials Research* 585, 240-244 (2012)
54. "Tailoring of surface melting of oxide based catalyst particles by doping to influence the growth of multi-walled carbon nano-structures," M Jana, A Sil, S Ray, *Carbon* 49 (15), 5142-5149 4 (2011)
55. "Tribological behavior of plasma sprayed Cr<sub>2</sub>O<sub>3</sub>-3% TiO<sub>2</sub> coatings," VP Singh, A Sil, R Jayaganthan *Wear* 272 (1), 149-158 30 (2011)
56. "Microstructural relationship with fracture toughness of undoped and rare earths (Y, La) doped Al<sub>2</sub>O<sub>3</sub>-ZrO<sub>2</sub> ceramic composites," K Maiti, A Sil, *Ceramics International* 37 (7), 2411-2421 30 (2011)
57. "Development of input output relationships for self-healing Al<sub>2</sub>O<sub>3</sub>/SiC ceramic composites with Y<sub>2</sub>O<sub>3</sub> additive using design of experiments, D Mohanty, A Sil, K Maiti, *Ceramics International* 37 (6), 1985-1992 10 (2011)
58. "Preparation of Nano and Micron Sized ZrO<sub>2</sub> Dispersed Al<sub>2</sub>O<sub>3</sub> Ceramic Composites and Study Their Hardness and Fracture Toughnesses," K Maiti, A Sil, *Processing and Properties of Advanced Ceramics and Composites III* 225, 75-83 (2011)
59. "A study on sliding and erosive wear behaviour of atmospheric plasma sprayed conventional and nanostructured alumina coatings," VP Singh, A Sil, R Jayaganthan, *Materials & Design* 32 (2), 584-591 90 (2011)
60. "Relationship between fracture toughness characteristics and morphology of sintered Al<sub>2</sub>O<sub>3</sub> ceramics," K Maiti, A Sil, *Ceramics International* 36 (8), 2337-2344 22 (2010)
61. "Effect of citric acid content on synthesis of LiNi<sub>1/3</sub>Mn<sub>1/3</sub>Co<sub>1/3</sub>O<sub>2</sub> and its electrochemical characteristics," G Singh, A Sil, S Ghosh, A Panwar, *Ceramics International* 36 (6), 1831-1836 13 (2010)
62. "Modification of the structure of multi-walled carbon nanotubes by choice of catalyst and their electro-chemical behavior," K Rana, A Sil, S Ray, *Materials Chemistry and Physics* 120 (2-3), 484-489 6 (2010)
63. "Phase Stability and Charge Capacity of Cubic Spinel in Li<sub>1+δ</sub>Mn<sub>2-δ</sub>O<sub>4</sub> and Consequence of Magnesium Doping," P Singh, A Sil, M Nath, S Ray, *Journal of The Electrochemical Society* 157 (3), A259-A266 8 (2010)

64. "Preparation and characterization of lithium manganese oxide cubic spinel  $\text{Li}_{1.03}\text{Mn}_{1.97}\text{O}_4$  doped with Mg and Fe," P Singh, A Sil, M Nath, S Ray, *Physica B* 405, 649 – 654 (2010)
65. "Preparation and characterization of lithium manganese oxide cubic spinel  $\text{Li}_{1.03}\text{Mn}_{1.97}\text{O}_4$  doped with Mg and Fe," P Singh, A Sil, M Nath, S Ray, *Physica B: Condensed Matter* 405 (2), 649-654 31 (2010)
66. "Relationship of the R-curve with the microstructure of alumina ceramics," K Maiti, A Sil, *Journal of Ceramic Processing Research* 11 (6), 678-684 (2010)
67. "Synthesis and characterisation of  $\text{Li}[\text{Mn}_{2-x}\text{Mg}_x]\text{O}_4$  ( $x= 0.0 - 0.3$ ) prepared by Sol-Gel synthesis," P Singh, A Sil, M Nath, S Ray, *Ceramics-Silikaty* 54 (1), 38-46 18 (2010)
68. "Synthesis of ribbon type carbon nanostructure using  $\text{LiFePO}_4$  catalyst and their electrochemical performance," K Rana, A Sil, S Ray, *Materials Research Bulletin* 44 (12), 2155-2159 8 (2009)
69. "Structural, thermal and morphological studies of magnesium substituted-lithium manganese oxide spinels," G Singh, A Sil, S Ghosh, *Physica B: Condensed Matter* 404 (20), 3807-3813 3 (2009)
70. "Suppression of Jahn–Teller distortion by chromium and magnesium doping in spinel  $\text{LiMn}_2\text{O}_4$ : A first-principles study using GGA and GGA+ U, G Singh, SL Gupta, R Prasad, S Auluck, R Gupta, A Sil, *Journal of Physics and Chemistry of Solids* 70 (8), 1200-1206 23 (2009)
71. "X-ray powder diffraction and electron diffraction studies of the thortveitite-related L phase,  $(\text{Zn},\text{Mn})_2\text{V}_2\text{O}_7$ , KM Knowles, ME Vickers, A Sil, YH Han, P Jaffrenou, *Acta Crystallographica Section B: Structural Science* 65 (2), 160-166 3 (2009)
72. "Preparation, characterization and ionic conductivity studies of  $\text{ZrO}_2$  dispersed mixed halide matrix  $(\text{KCl})_{0.9}-(\text{NaCl})_{0.1}$ ," A Gupta, A Sil, NK Verma, *Journal of Physics and Chemistry of Solids* 70 (2), 340-343 1 (2009)
73. "Synthesis and characterization of citric acid assisted Cr doped lithium manganese oxide spinel," G Singh, A Panwar, A Sil, S Ghosh, *Ceramics-Silikaty* 53 (4), 260-267 7 (2009)
74. "Synthesis and characterization of carbon nanotubes by using catalyst  $\text{LiNi}_{0.5}\text{Co}_{0.5}\text{O}_2$  on anodized alumina substrate," K Rana, A Sil, S Ray., *Advanced Materials Research* 67, 197-202 1 (2009)
75. "Synthesis and characterization of  $\text{LiMn}_2\text{O}_4$  nanoparticles using citric acid as chelating agent," G Singh, A Panwar, A Sil, S Ghosh, *Advanced Materials Research* 67, 227-232 3 (2009)
76. "Preparation and Characterization of  $\text{Li}[\text{Mn}_{2-x}\text{Fe}_x]\text{O}_4$  ( $x = 0.0 - 0.6$ ) Spinel Nanoparticles as Cathode Materials for Lithium Ion Battery," P Singh, A Sil, M Nath, S Ray, *Advanced Materials Research* 67, 233-238 1 (2009)
77. "Carbon nanotube/nanofiber embedded nanoporous anodized aluminium oxide surface and its tribological properties," MK Kushwaha, A Sil, S Ray, *Journal of nanoscience and nanotechnology* 8 (8), 4152-4158 11 (2008)
78. "Synthesis of nanosized AlN powder using novel nitridation route," A Sil, PK Verma, *Ind JI of Engg & Mat Sc*, 14, pp.309-312 (2007)
79. "Preparation of rare earth oxide doped alumina ceramics, their hardness and fracture toughness determinations," K Maiti, A Sil, *Ind JI of Engg & Mat Sc*, 13, pp.443-450 (2006)
80. "Transport characteristics of  $\text{ZrO}_2$  dispersed mixed  $(\text{BaCl}_2)_{1-x}-(\text{KCl})_x$  solid electrolytes," A Gupta, A Sil, *Materials research bulletin* 40 (1), 67-77 1 (2005)

81. "Structural and dielectric properties of MgO doped 0.8 PMN-0.2 PT solid solution," Y Sharma, A Sil, KL Yadav, CSIR 2 (2005)
82. "Preparation and characterization of mixed halide systems as solid electrolyte base," A Gupta, A Sil, NK Verma, Ind JI Engg & Mat Sc, 11, pp.212-216 (2004)
83. "Preparation, characterization and ionic conductivity measurements of (1-x) KCl : x ZrO<sub>2</sub> solid electrolyte system," A Gupta, A Sil, Ind JI Engg & Mat Sc, 9, pp. 65–68 (2002)
84. "Preparation and Electrical Characteristics of Al Doped ZnO-Bi<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> Varistors,' R Goel, A Sil, HR Anand, TRANSACTIONS-MATERIALS RESEARCH SOCIETY OF JAPAN 26 (1), 1-4 (2001)
85. "Transport characteristics of 0.3 KCl : 0.7 ZrO<sub>2</sub> solid electrolyte," A Mangla, A Sil, Ind JI Pure & Appl Phy, 39, pp. 267–270 (2001)
86. "Grain growth studies of Al doped ZnO-Bi<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> (0.4-0.6 mol %) varistors," R Goel, A Sil, HR Anand, SR Prabhakar, Ind JI Engg & Mat Sc, 7, pp. 344–349 (2000)
87. "Microstructural and electrical characteristics of SiO<sub>2</sub> doped ZnO-Bi<sub>2</sub>O<sub>3</sub> varistors," R Goel, A Sil, HR Anand, Bulletin of Materials Science 22 (1), 49-57 7 (1999)
88. "Modelling of barium transport in dispenser cathodes," A Sil, DS Venkateswarlu, Applied surface science 81 (4), 469-473 1 (1994)
89. "Transient thermal response of the cathode surface of a potted heater-cathode structure," A Sil, DS Venkateswarlu, A Chatterjee, MM Shukla, AJ Rani, IEEE Transactions on Electron Devices 41 (8), 1480-1481 (1994)
90. "Estimation of dispenser cathode surface temperature of a practical potted heater cathode assembly," A Sil, NK Samria, A Chatterjee, DS Venkateswarlu, IEEE Transactions on Electron Devices 40 (10), 1855-1863 8 (1993)
91. "Analytical studies of electrode surface temperatures for convergent electron gun," A Sil, NK Samria, DS Venkateswarlu," Indian Journal of Pure and Applied Physics 31 (2), 106-112 2 (1993)
92. "Imperfect boundaries: Thermal response of the cathode surface of a potted heater-cathode assembly," DS Venkateswarlu, A Sil, Applied surface science 52 (1-2), 7-17 5 (1991)
93. "Thermal analysis of a cathode: Temperature distribution and warm-up time," A Sil, NK Samria, DS Venkateswarlu, Applied surface science 45 (3), 229-245 6 (1990)
94. "Optimal Thermodynamic Design of Potted Heater-Cathode Assemblies: Some Considerations," A Sil, DS Venkateswarlu, NK Samria, IETE Technical Review 6 (6), 440-444 1 (1989)

## **National and International Conf. Publications**

1. Ayush Pundir and Anjan Sil, "Biowaste-derived hierarchical porous carbon structure for trapping polysulfides in Li-S battery," Advances in Materials and Processing: Challenges & Opportunities (AMPCO 2022), IIT Roorkee, 17-19 October 2022.
2. Bharat Verma, Anjan Sil, "Tin oxide / hard carbon nanocomposite as superior negative electrode material for sodium-ion battery," Advances in Materials and Processing: Challenges & Opportunities (AMPCO 2022), IIT Roorkee, 17-19 October 2022 (Best Paper Award).



3. Basitti Hitesh, Anjan Sil, "Ionic Conductivity and Mechanical Properties of Spark Plasma Sintered  $\text{Na}_3\text{Zr}_2\text{Si}_2\text{PO}_{12}$  Solid Electrolyte," Advances in Materials and Processing: Challenges & Opportunities (AMPCO 2022), IIT Roorkee, 17-19 October 2022.
4. Nitamkumar Tayade and Anjan Sil, "CNT Reinforced Polyurethane Nanocomposites for Enhanced Damping and Storage Modulus," International workshop on nanoengineered materials (IWNEM 2023), IISER Thiruvananthapuram Kerala, 5-6 Jan 2023.
5. Bharat Verma, Anjan Sil, "Hard Carbon Surface modification by nanolayer coating for ICE enhancement for Na-ion battery," International workshop on nanoengineered materials (IWNEM 2023), IISER Thiruvananthapuram Kerala, 5-6 Jan 2023.
6. Ayush Pundir and Anjan Sil, "Heteroatom-doped biowaste derived hierarchical porous carbon structure as cathode material for Li-S battery," International Conference on Advances in Renewable Energy (CARE 2023), Harishchandra Research Institute, Prayagraj (UP), 2-4 February 2023.
7. Anjan Sil and Hari Raj, "Rechargeable Lithium Ion Battery Cathode Material  $\text{LiFePO}_4$  : Limitations and Possible Overcome," International Conference on Materials Research and Nanotechnology," June 10-12, (2019), Rome, Italy.
8. Hari Raj and Anjan Sil, "Study of antisite defects in  $\text{LiFePO}_4$  cathode of Li-ion battery," International Meeting on Energy Storage Devices & Industry-Academia Conclave, IIT Roorkee, December 10 - 12, (2018).
9. Abhishek Kumar Gupta and Anjan Sil, "Temperature-dependent stability of energy storage properties of spark plasma sintered  $\text{PbZr}_{0.52}\text{Ti}_{0.48}\text{O}_3$  for pulsed power applications," International Meeting on Energy Storage Devices & Industry-Academia Conclave, IIT Roorkee, December 10 - 12, (2018).
10. Hari Raj and Anjan Sil, "Conducting polymer PEDOT:PSS coating on pristine and carbon coated  $\text{LiFePO}_4$  : the study of electrochemical performance," Proc. of 2nd National Symposium on shaping and energy future : challenges and opportunities (SEFCO – 2018), CSIR – Indian Institute of Petroleum Mohhampur, Dehradun – 248005, May 11 -12, (2018).
11. H. Raj and A.Sil, "Preparation of  $\text{LiFePO}_4/\text{SWCNT}$  composite for high performance lithium ion batteries," International Conference on Nanotechnology : Ideas, Innovations & Initiatives – 2017 (ICN : 31 – 2017), IIT Roorkee, Dec 6 -8, 2017.
12. Hari Raj and Anjan Sil, "Study of electrochemical performance of  $\text{LiFePO}_4/\text{Li}_4\text{Ti}_5\text{O}_{12}$  full cell for next generation Li-ion batteries," Int. Conf. on Advances in Materials & Processing : Challenges & Opportunities, 30 Nov – 2 Dec, (2017), IIT Roorkee, India.
13. Abhishek Kumar Gupta and Anjan Sil, "Energy storage performance of spark plasma sintered antiferroelectric  $\text{PbZr}_{0.97}\text{Ti}_{0.03}\text{O}_3$ , ceramic" Int. Conf. on Advances in Materials & Processing : Challenges & Opportunities, 30 Nov – 2 Dec, (2017), IIT Roorkee, India (Awarded Best Poster).
14. Siddharth Singh, Sandip Bysakh and Anjan Sil, "Compatibility study of  $\text{La}_2\text{NiO}_{4+\delta}$  and  $\text{La}_2\text{Mo}_{1.5}\text{W}_{0.5}\text{O}_9$  as electrode-electrolyte material for fuel cell," Int. Conf. on Advances in Materials & Processing : Challenges & Opportunities, 30 Nov – 2 Dec, (2017), IIT Roorkee, India.
15. Hari Raj and Anjan Sil, "Electrochemical studies comparison of  $\text{LiFePO}_4$  as Li-ion battery cathode material synthesized by sol-gel and solid state route," Proc. 10th National Conference on Solid State Chemistry and Allied Areas (ISCAS-2017), Delhi Technical University, Delhi, 1-3 July, (2017). (Awarded ISCAS Endowment Medal for the poster presentation)
16. Hari Raj and Anjan Sil, "Comparative studies on conductivity and electrochemical performance of pristine and carbon coated  $\text{LiFePO}_4$  as Li-ion battery cathode material," International Conference on Advanced Functional Materials (ICAFM-2017), Anna University, Chennai, 6-8 January, (2017).

17. Sobhit Saxena and Anjan Sil "Excess Li in synthesis of sol-gel derived phase pure Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>" International Conference on Advanced Functional Materials (ICAFM-2017), Anna University, Chennai, 6-8 January, (2017).
18. Hari Raj, Sobhit Saxena and Anjan Sil "Internal Hybrid System of Li-Ion Battery and Supercapacitor", 3rd International Conference on "Applied Sciences, Environmental Engineering and Clean Energy Technologies for Sustainable Development" Jawaharlal Nehru University, New Delhi, April 25-26, (2015).
19. Rajni Sharma, Anjan Sil and Subrata Ray, "Structural, thermal and ionic properties of PVDF-HFP based nanocomposite gel polymer electrolytes dispersed with CNTs for li-ion batteries", APM-2015, Feb 20-22, (2015) at IISc Bangalore.
20. R. Sherawat and A. Sil, "Synthesis and characterization of polyaniline coated LiFePO<sub>4</sub>/C cathode materials with excess lithium doping,,: 2nd International Conference on Innovations in Engineering and Technology (ICCET2014), Sept 19-20, 2014, Penang Malaysia.
21. Sobhit Saxena and Anjan Sil, "Nanoporous Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub> material for electrode of lithium ion battery" Conference proceedings of 2nd IEEE International Conference on Emerging Electronics (ICEE-2014), IISc Bangalore, 3-6 December, (2014).
22. Sobhit Saxena and Anjan Sil, "Synthesis of nanoporous Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub> by using carbon nano beads as pore former" proceedings of International Conference on Functional Materials (ICFM-2014), IIT Kharagpur, 5-7 February, (2014).
23. Rajni Sharma, Anjan Sil and Subrata Ray, "Preparation and Characterization of Nanocomposite Polymer Electrolytes Based on Poly(Methyl Methacrylate) with Nano-sized Ceramic Fillers", MS&T-2014, Oct 12-16, (2014) at Pittsburgh, USA.
24. Anjan Sil, Rajni Sharma and Subrata Ray, "Mechanical and thermal characteristics of PMMA based nanocomposite gel polymer electrolytes with CNFs dispersion" NANOSMAT-2014, Sept 8-11, (2014) at Dublin, Republic of Ireland.
25. Rajni Sharma, Anjan Sil and Subrata Ray, "Conductivity, infrared and thermal studies on plasticized polymer electrolytes with nano-sized ceramic fillers", PSC-2014, Feb 14-16, (2014) at PTU Jalandhar.
26. Rajni Sharma, Anjan Sil and Subrata Ray, "Synthesis and Characterization of 0.60P(VdF-HFP):0.15(PC+DEC):0.10LiClO<sub>4</sub> gel polymer electrolyte", AMSEA-2014, Jan 9-10, (2014) at UPES Dehradun.
27. Anjan Sil and Syed Idrees Afzal Jalali, "Synthesis and characterization of tape casted solid oxide fuelcellelectrolyte," International conference on "Innovative trends in Mechanical, Material, Manufacturing, Automotive, Automobile and Aeronautical Engineering", JNU, Delhi, Feb. 15-16, (2014).
28. Rajni Sharma, Anjan Sil and Subrata Ray, "Conductivity and thermal behavior of P(VDF-HFP) based nanocomposite polymer electrolytes", Proceedings of International Conference on Functional Materials (ICFM-2014), IIT Kharagpur, Feb 5-7, (2014).
29. Rajni Sharma, Anjan Sil, Subrata Ray, "Synthesis and Characterization of 0.60P(VdF HFP):0.15(PC+DEC):0.10LiClO<sub>4</sub> gel polymer electrolyte", Proceedings of National Conference for Advances in Material Science for Energy applications (AMSEA-2014), UPES (University of Petroleum and Energy Studies), Dehradun, Jan 9-10, (2014).

30. Sobhit Saxena and Anjan Sil, "Synthesis of nanoporous  $\text{Li}_4\text{Ti}_5\text{O}_{12}$  by using carbon nano beads as pore former" proceedings of International Conference on Functional Materials (ICFM-2014), IIT Kharagpur, 5-7 February, (2014).
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32. M. Jana, A. Sil and S. Ray, "Effect of size and doping of metal oxide particles on surface melting," International Conf. on Electron Microscopy and the XXXIV Annual Meeting of the Electron Microscope Society of India (EMSI 2013), July 3 – 5, (2013), Kolkata.
33. M. Jana, A. Sil and S. Ray, "Effect of size and doping of metal oxide particles on surface melting," International Conf. on Electron Microscopy and the XXXIV Annual Meeting of the Electron Microscope Society of India (EMSI 2013), July 3 – 5, (2013), Kolkata.
34. M. Jana, A. Sil and S. Ray. "Hybrid of carbon nanostructures and their application in the anode of rechargeable Li-ion batteries". 4th International Conference on Recent Advances in Composite Materials (ICRACM). Feb. 18-21, (2013); Goa, India.
35. Sobhit Saxena, " Synthesis of template based porous nano-structured  $\text{Li}_4\text{Ti}_5\text{O}_{12}$  with graphene coated surface as anode material for lithium ion battery", proceedings of International Conference on Nanomechanical Sensing", IIT Bombay, 6-8 June, (2012).
36. Rajni Sharma, Anjan Sil and Subrata Ray, "Ionic Conduction in P(VdF-HFP)-(PC+DEC)- $\text{LiClO}_4$  Gel Polymer Electrolytes", ISRS-2012, Dec 13-15, (2012) at IIT Madras.(Best Paper Award)
37. Rajni Sharma, Anjan Sil and Subrata Ray, "Characterization of Plasticized PMMA- $\text{LiClO}_4$  Solid Polymer Electrolytes", AMPCO-2012, Nov 2-4, (2012) at IIT Roorkee.
38. Rajni Sharma, Anjan Sil and Subrata Ray, "Investigation of Ionic Conduction in PMMA- $\text{LiClO}_4$ -(PC-DEC) Polymer Gel Electrolytes", GC-RSTS-2012, March 3-4, (2012) at TITS Bhiwani.
39. Rajni Sharma, Anjan Sil and Subrata Ray, "Ionic conduction in P(VDF-HFP)-(PC+DEC)- $\text{LiClO}_4$  Gel Polymer Electrolytes", Proceedings of International Symposium for Research Scholars (ISRS-2012), IIT Madras, Dec 13-15, (2012).
40. Rajni Sharma, Anjan Sil and Subrata Ray, "Characterization of Plasticized PMMA- $\text{LiClO}_4$  Solid Polymer Electrolytes", Proceedings of International Conference on Advance in Materials and Processing Challenges and Opportunities (AMPCO-2012), IIT Roorkee, Nov 2-4, (2012).
41. Sobhit Saxena, " Synthesis of template based porous nano-structured  $\text{Li}_4\text{Ti}_5\text{O}_{12}$  with graphene coated surface as anode material for lithium ion battery", proceedings of International Conference on Nanomechanical Sensing", IIT Bombay, 6-8 June, (2012).
42. Vinay Pratap Singh, Anjan Sil, R. Jayaganthan, Dry Sliding and Abrasive Wear Performance of Manually Granulated Nanostructured  $\text{Al}_2\text{O}_3$  Coatings, AMPCO 2012, IIT Roorkee, Roorkee, Uttarakhand, Nov (2012).
43. Kiran A, Anjan Sil and Kevin M Knowles, "Sol-gel derived thin films in doped ZnO-based system and study their V-I characteristics," Proc., International Conference on Electrical Engineering and Computer Science (ICEECS-2012), 12 May, (2012), Interscience Research Network, Bhubaneswar, India.
44. Kuntal Maiti and Anjan Sil. "Effect of Sintering Temperature and Soaking Time Period on the Preparation of Alumina Ceramics and their Hardness Characteristics". 4th International & 25th All India Manufacturing Technology, Design and Research Conference (AIMTDR). Dec. 14-16, (2012); Jadavpur University, Kolkata. India.

45. M. Jana, A. Sil and S. Ray. "Fabrication of carbon nanostructures by CCVD using nano-porous alumina template". 4th International & 25th All India Manufacturing Technology, Design and Research Conference (AIMTDR). Dec. 14-16, (2012) ; Jadavpur University, Kolkata. India.
46. M. Jana, A. Sil and S. Ray. "Influence of melting of transition metal oxides on the morphology of carbon nanostructures". Advances in Materials and Processing Challenges and Opportunities. Nov. 2-4, (2012) ; IIT Roorkee, India.
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48. Kuntal Maiti, Anjan Sil, "Influence of microstructure on fracture toughness of Al<sub>2</sub>O<sub>3</sub> ceramic," National Seminar Microstructure-2011 on "Microstructure on across length scales and material properties," 4-5 November, (2011), IIT Roorkee.
49. Anjan Sil, A.P.Niranjana and Kevin M. Knowles, "Synthesis and characterization of ZnO-V<sub>2</sub>O<sub>5</sub>-MnO ceramic thin films for low voltage varistor applications," National Seminar Microstructure-2011 on "Microstructure on across length scales and material properties," 4-5 November, (2011), IIT Roorkee.
50. M. Jana, A. Sil and S. Ray. "Doping and growth of carbon nano-structures". International Conference on Indian Metals Industry-Shaping the Next Decade. Feb. 12-14, (2011) ; IIM News Letter, New Delhi, XXXX (40), p.7.
51. A. Sil, S. Ray and M. Jana. "Carbon nano-composite materials for energy storage application". 4th International Symposium on Advancing the Chemical Sciences-Challenges in Renewable Energy. July 05-08, (2011) ; MIT, Boston, United States of America.
52. M. Jana, A. Sil and S. Ray. "Selective growth of carbon nanostructures: Role of surface melting". International Conference on Advances in Materials and Materials Processing. Dec. 9-11, (2011) ; IIT Kharagpur, India.
53. Kuntal Maiti and Anjan Sil, "Fabrication and mechanical properties of nano-and micron-sized Al<sub>2</sub>O<sub>3</sub>/ZrO<sub>2</sub> composites", Proceedings of International Conference on Advancement of Nanoscience and Nanotechnology (ICOANN-2010) to be held at Alagappa University, Karaikudi, Tamil Nadu, March 1-3, (2010).
54. Kuntal Maiti and Anjan Sil, "Preparation of Nano and micron sized ZrO<sub>2</sub> dispersed Al<sub>2</sub>O<sub>3</sub> ceramic composites and study their mechanical properties", Proceeding on International conference on nano science and Technology, ICONSAT-2010, I.I.T. Bombay, Powai, India, 17-20 February, (2010).
55. Gurpreet Singh, Anjan Sil, Kuntal Maiti, Prity Singh, Sudipto Ghosh, "Synthesis and characterization of the doubly doped lithium manganese oxide spinel" Proceedings of International conference on Nanotechnology and technology in chemistry, health, environment and energy, NATCHEE 2010, January 7-9, (2010).
56. Gurpreet Singh, Anjan Sil, Sudipto Ghosh, "Synthesis and characterization of the doubly doped lithium manganese oxide spinels," Proceedings, International Conf., Nanoscience and Technology in Chemistry, Health, Environment and Energy, NATCHEE 2010, pp. 114-1118, Dayalbagh Educational Institute, Agra, India, Jan 7-9, (2010) (Published by Tata McGraw Hill Education Pvt Ltd).
57. Priti Singh, Anjan Sil, Mala Nath and S Ray, "Preparation and characterization of Mg doped Li<sub>1.33</sub>Mn<sub>1.67</sub>O<sub>4</sub> spinel nanoparticles as cathode materials for lithium ion battery," Proceedings, International Conf., Nanoscience and Technology in Chemistry, Health, Environment and Energy, NATCHEE 2010, pp. 109-113, Dayalbagh Educational Institute, Agra, India, Jan 7-9, (2010) (Published by Tata McGraw Hill Education Pvt Ltd).

58. Kuntal Maiti and Anjan Sil , “Preparation of SiC dispersed Al<sub>2</sub>O<sub>3</sub> ceramic composites and studies their fracture toughness”, Proceedings of 63rd Annual Technical Meeting of The Indian Institute of Metals,Kolkata,India,16-17 November, (2009).
59. Kuntal Maiti and Anjan Sil, “Al<sub>2</sub>O<sub>3</sub>-SiC Ceramic Composites And Their Fracture Toughness Characteristics”,Proceedings of MR-09 Held in IIT Mumbai ,8-9th May, (2009).
60. Kevin M. Knowles, Mary E. Vickers, Anjan Sil, Yung-Hoe Han and Périne Jaffrenou,“The L phase, (Zn,Mn)<sub>2</sub>V<sub>2</sub>O<sub>7</sub>,”International Conf., Electroceramics XI, University of Manchester, UK, Sept. (2008).
61. Kuldeep Rana, Anjan Sil and S. Ray, “Synthesis and characterization of Mg doped manganese oxide system and its lithiation,” Proceedings 53rd DAE Solid State Physics Symposium, volume 53, p.1279, (2008).
62. M.K.Kushwaha, Anjan Sil, S. Ray, “Preparation of anodic aluminium oxide (AAO) surface and its pore distribution characteristics,” Global Conference on Production and Industrial Engineering, CPIE-2007, N.I.T. Jalandhar, March 22-24, (2007).
63. Manoj Kumar Kushwaha, Anjan Sil & Subrata Ray,“Carbon nanotube / nanofiber embedded in nanopores of anodized aluminium oxide (AAO) surface,” International conference on experimental condensed matter physics, (ANM- 2007), I.I.T. Mumbai, Jan 8-10, (2007).
64. Monika Chaudhary, Amrita Singh, Tashi Nautiyal, Sushil Auluck, Subrata Ray & Anjan Sil, “Electronic structure and co-intercalation of graphite,” Workshop on Emerging Trends in Power Source Systems for Aerospace and Related Applications (PSSARA – 2006), Research Centre Imarat (RCI), Hyderabad, Oct 6-7, (2006).
65. Kuldeep Singh Rana, Amrish Panwar, Yogesh Sharma, Anjan Sil & Subrata Ray, “Synthesis and characterization of (MnO<sub>2</sub>)<sub>1-x</sub> : (MgO)<sub>x</sub> cathode base material,” Workshop on Emerging Trends in Power Source Systems for Aerospace and Related Applications (PSSARA – 2006), Research Centre Imarat (RCI), Hyderabad, Oct 6-7, (2006).
66. Priti Singh, Anjan Sil & Subrata Ray, “Synthesis and XRD analysis of Li<sub>2</sub>(Mn<sub>1-x</sub>Mg<sub>x</sub>)O<sub>2</sub>(x = 0.01–0.20) cathode materials,” Workshop on Emerging Trends in Power Source Systems for Aerospace and Related Applications (PSSARA – 2006), Research Centre Imarat (RCI), Hyderabad, Oct 6-7, (2006).
67. Kuldeep Singh Rana, Anjan Sil and Subrata Ray, “Effect of mechanical grinding on graphite powder characteristics,” Workshop on Emerging Trends in Power Source Systems for Aerospace and Related Applications (PSSARA – 2006), Research Centre Imarat (RCI), Hyderabad, Oct 6-7, (2006).
68. Yogesh Sharma, Anjan Sil and K.L.Yadav, “Effect of sintering temperature on the microstructure and dielectric properties of PbO and MgO doped 0.8PMN-0.2PT,” Thirteenth National Seminar on Ferroelectrics and Dielectrics, University of Delhi,Nov 23 – 25, (2004).
69. Archana Gupta, Anjan Sil and N.K.Verma, “Electrical conductivity measurements of ZrO<sub>2</sub> dispersed mixed (KCl)<sub>1-x</sub> – (KI)<sub>x</sub> solid electrolytes,” Proc. National Conf. on Materials and Related Technologies, pp.9 – 15,Patiala, Sept. 19-20, (2003).
70. Archana Gupta, Anjan Sil and N.K.Verma, “Role of mixed halides as solid electrolyte base matrix,” 5th Punjab Science Congress, Science and Technology in New Millennium, PHO-59,Patiala, Feb. 7 –9, (2002).
71. R. Goel, A.Sil, S.R. Prabhakar, “Effect of SiO<sub>2</sub> addition to ZnO–Bi<sub>2</sub>O<sub>3</sub> based varistors,” Proc. National Seminar on Advances in Materials & Processing, pp 222–228, IIT Roorkee Nov. 9–10, (2001).

72. Anjan Sil and Harjinder Singh, "Effect of sintering characteristics on dielectric behaviour of BaTiO<sub>3</sub> ceramics," Abstracts, National Seminar on Materials Science : Trends & Future, (MSTF-2000), PS6-09, SLIET, Longowal, Feb. 24-25, (2000).
73. Archana Gupta & Anjan Sil, "Preparation, characterization and ionic conductivity measurement of (1-x) KCl: x ZrO<sub>2</sub> solid electrolyte system," Abstracts, National Seminar on Materials Science : Trends & Future, (MSTF-2000), OP5-05, SLIET, Longowal, Feb. 24-25, (2000).
74. R Goel, A Sil, H R Anand and S R Prabhakar, "Grain growth studies of ZnO based varistors," Abstracts, National Seminar on Materials Science : Trends & Future, (MSTF-2000), PS3-17, SLIET, Longowal, Feb. 24-25, (2000).
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76. Goel R, Sil A, Anand H R and Prabhakar S R, "Effect of silica on the grain growth of ZnO-Bi<sub>2</sub>O<sub>3</sub> varistors," Information Booklet, 3rd Punjab Science Congress and Symposium, p.15, Punjab University, Chandigarh, Dec. 10-12, (1999).
77. Anjan Sil and Harpreet Pal Singh, "Preparation, characterization and performance of BaTiO<sub>3</sub>-based positive temperature coefficient thermistors," Proc. 6th National Seminar on Physics and Technology of Sensors, pp C-2-1 – C-2-6, TIET, Patiala, March 4-6, (1999).
78. Roopa, A Sil, and H R Anand, "Microstructural and electrical investigations of ZnO based varistor," Programme & Abstracts, 7th Annual General Meeting, MRSI, D14, I.I.Sc, Bangalore, Feb. 1-3, (1996).
79. Roopa, A Sil and H R Anand, "Microstructural investigations of ZnO- Bi<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> varistors," 87th Indian Science Congress, Patiala, (1996).
80. Roopa, H R Anand and A Sil, "Microstructural and electrical characteristics of ZnO-Bi<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> varistors," Souvenir 6th Annual General Meeting, MRSI, IIT Kharagpur, Feb. 8 -10 (1995).
81. V Kumar, A Sil and H R Anand, "Conductivity dependence on concentration of insulating particulate phase in the AgI – Al<sub>2</sub>O<sub>3</sub> dispersed phase solid electrolyte system," National Conference on Ferroics, GNDU, Amritsar, Jan (1994).
82. G.D. Singh, Anjan Sil, G.S. Raju and D.S. Venkateswarlu, "Rapid cooling of transformer through heat pipe," Proc. National Seminar on Computer Hardware and Software applications to Energy Systems and Devices, REC, Rourkela, Feb 23-25, (1989).
83. Anjan Sil, N.K. Samria and D.S. Venkateswarlu, "Transient solution of heat transfer in a composite ceramic-metal body with radiative boundaries," Proc. Seminar-cum-workshop, Advances in Ceramics, pp. 72-78, BHU, Varanasi, Feb. 10-11, (1988).
84. Anjan Sil, D.S. Venkateswarlu and N.K. Samria, "Composite ceramic-metal body : steady state solution of heat transfer under radiative boundaries," Proc. 51st Annual Session, Indian Ceramic Society, Varanasi, (1987).
85. Anjan Sil, S.K. Srivastava, D.S. Venkateswarlu and R. Balaji Rao, "Heat pipe design and testing," Proc. 74th Indian Science Congress, Part IV, p.141, Bangalore, (1987).
86. Anjan Sil, D.S. Venkateswarlu and S.K. Srivastava, "Feasibility studies on microwave tube cooling using heat pipe technique," Proc. Conf. Thermal Systems, pp. 295 – 298, BHU, Varanasi, Feb. 22-23, (1986).

### **Patents granted:**

(1) "Nut shaped  $\text{Li}_3\text{VO}_4$  having hierarchical mesoporous structure and its method of synthesis," Patent No. 382774, Date of Grant: 26/11/2021

(2) "A novel electrode composite for high power and high energy application in rechargeable Li-ion battery," Patent No. 400066, Date of Grant: 27/06/2022

### **Patents filed:**

(1) "An organic photovoltaic cell for solar tile application" application no. 202211049893 dated 01/09/2022.

(2) "A single step synthesis of hard carbon from agro-waste for sodium-ion battery," application no. 202211051784 dated 10/09/2022, Published at the IPO website on 23/09/2022.

(3) "A high-performance composite electrode for Li-ion battery,<sup>2</sup> application no. 202011035788 dated. 19.08.2020, Published at the IPO website on 05/03/2021.

(4) "A three-terminal lithium ion battery-supercapacitor hybrid system consisting of bi-material electrode" application no. 202011017484 dated. 23.04.2020, Published at the IPO website on 29.10.2021.

(5) "Development of porous alumina film on conducting glass substrate to enhance the voltage of silicon-based thermophotovoltaic devices," SSCPL/IITR/2019-20/CRN065, application no. 201911038839 dated. 26.09.2019, Published at the IPO website on 02.04.2021.

(6) "A method of preparing a high energy density silicon graphite anode material and a high energy density silicon-graphite material," 392/Del/2010, dated 22.02.2010.

### **Book chapter authored**

"Morphology of cylindrical carbon nanostructures grown by catalytic chemical vapor deposition method," S. Ray, M. Jana, **A. Sil**, Graphene Science Handbook : Nanostructure and Atomic Arrangement, Vol. 2, Chapter-8, CRC Press, Taylor & Francis, 2016, ISBN-13:978-1-4665-9138-7.

### **Sponsored Projects Completed / Ongoing (as a PI / Co-PI)**

1. ISRO Bengaluru, "Development of solid electrolytes for high voltage and high energy density Li and Na-ion batteries," Rs. 25.11 lakhs (Oct 2022 – Oct 2024).

2. Council of Scientific and Industrial Research, New Delhi project, "Development of conducting polymer coated  $\text{LiFePO}_4$  nano-composites as cathode materials for next generation lithium ion batteries.," Rs. 9.12 lakhs (July 2015 – Mar 2018).

3. British Council (UKIERI), UKIERI Collaborative Research Award, "Development of thin film varistors for low voltage applications," in collaboration with University of Cambridge, UK, Rs. 15.04 lakhs (for Indian part) (Apr 2008 - Dec 2013).

4. Department of Science and Technology CP-STIO Programme project, "Studies on atomic arrangements and bonding (alloyed) and intercalated carbon nanotubes, graphite and composites," in collaboration with North Carolina State University, USA, Rs. 5.88 lakhs (April 2009 - Mar 2011).
5. Department of Science and Technology Indo-Australian project, "Nano-composite materials for clean energy: energy generation, storage, savings and safety," in collaboration with the University of Queensland, Australia, Rs.40.85 lakhs (April 2009 - Mar 2012).
6. Ministry of Defence, N. Delhi, sponsored project, "Development of high energy density lithium ion battery technology," Rs.22.58 lakhs (Feb 2004 - Jan 2009).
7. Ministry of Defence, N. Delhi, sponsored project, "Fundamental studies on lithium-graphite anode." Rs. 21.37 lakhs (Dec 2004 - Nov 2007).
8. UGC, N.Delhi, "Study of ionic conductivity enhancement in Cu halide : NiO system and development of composite electrolyte," Rs. 5.90 lakhs (Oct 1996 - Sept 2000).
9. AICTE, N.Delhi, "Raising infrastructure for research and development in the area of high performance ceramics," Rs. 11.00 lakhs (Apr 1995 - Mar 1998).

### **Honors and Awards**

1. IT Roorkee March 04–05, 2023, Chairperson, DRDO Session I, Conference Emergent Materials. for Energy and Environment.
2. Jiwaji University, Gwalior, National Conference on Emerging Trends in Materials Chemistry (NCETMC), 27-28 Feb 2023, Felicitation of Eminent Academician for his significant contribution to the field of Materials Engineering.
3. ASEM-DUO 2020 DUO-India Professor Fellowship Award with the Technical University of Denmark for collaboration. Visited DTU, Denmark during 21 September to 15 October 2022.
4. British Council 2008 UKIERI Research Award for a collaborative project with University of Cambridge (UK) during 2008 to 2013.
5. Guest of Honour at the National Science Day function, 2018 at CSIR-CBRI, Roorkee, Uttarakhand.
6. Chairing a session at "3rd World Congress on Materials Science and Engineering," 24 - 26 August 2017, Barcelona, Spain.
7. Leader of Jury to judge posters in Workshop on "Battery technologies and electric mobility," H & P Green, R & D Centre, HPCL Bangalore, 8-9 Mar 2018.
8. Chairing a Popular Lecture by Prof. V K Pillai, Director, CSIR-CECRI, Karaikudi, India, IMESD-2018, Indian Institute of Technology Roorkee 2018.
9. Moderator, Panel Discussion, Session – I, European Union-India Cooperation in 'Climate and Energy', April 22, 2021.
10. Recipient of visiting scientist under INSA - The Royal Society London Exchange of Scientists Programme in the year 2003 as well as year 2007.



11. Recipient of visiting scientist under INSA-DFG exchange programme in 2017.

### **International visits**

1. University of Cambridge (UK) Visited during 2003 and 2007 for INSA - The Royal Society Exchange of Scientists Programmes.
2. University of Cambridge (UK) Visited several times during 2008 – 2013 for UKIERI collaborative research project work.
3. MIT, BOSTON, USA Visited during 4 Jul - 10 Jul 2011 to attend 4th International Symposium on Advancing the Chemical Sciences-Challenges in Renewable Energy.
4. Trinity College, Dublin, Ireland Visited during 7 Sep - 13 Sep 2014 to attend 9th International Conference on Surfaces, Coatings and nanostructured Materials.
5. Barcelona, Spain Visited during 22 Aug - 29 Aug 2017 to attend "3rd World Congress on Materials Science, Engineering, Oil, Gas and Petrochemistry" and deliver a keynote presentation on Electrochemical characteristics of battery-supercapacitor hybrid device having bi-material electrode.
6. HIU, Germany Visited during 30 Sep - 19 Oct 2017 for 3 weeks under INSA-DFG exchange programme.
7. Rome, Italy Visited during 9 June - 18 June 2019 to attend International Conference on Materials Research & Nanotechnology and deliver an invited talk on Rechargeable lithium ion battery cathode material  $\text{LiFePO}_4$ : limitations and possible overcome. The conference was held during June 10 - 12, 2019.
8. Technical University of Denmark (DTU) during 21 Sept - 15 Oct 2022 for DUO-India Professor's Fellowship programme.

### **Membership of Professional Societies**

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|--|-------|-------------|
| 1. Materials Research Society of India                                   | ----- | Life member |
| 2. The Indian Ceramic Society  | ----- | Life member |
| 3. The Indian Society for Technical Education                            | ----- | Life member |
| 4. Indian Thermal Analysis Society                                       | ----- | Life member |
| 5. Punjab Academy of Sciences  | ----- | Life member |
| 6. Indian Chapter of the International Centre<br>for Theoretical Physics | ----- | Life member |
| 7. Royal Society of Chemistry 13 May 2014-12 May 2015                    | ----- | Member      |

### **Administrative Positions held:**

1. Head of the Department of Metallurgical and Materials Engineering, Indian Institute of Technology Roorkee during 01 Mar 2016 - 31 Mar 2019.

2. Chairman JEE (Advanced) 2015, IIT Roorkee.
3. Vice Chairman JEE (Advanced) 2014, IIT Roorkee.
4. NSS Faculty Coordinator during 01 Jan 2012 - 01 Sep 2014, IIT Roorkee.
5. Department Research Committee (DRC) Chairman during 01 Jan 2013 - 01 Jan 2016, IIT Roorkee.
6. Chairman, Organizing Committee, International Conference on Advances in Materials & Processing: Challenges & Opportunities 30 Nov 2017 - 02 Dec 2017, IIT Roorkee.
7. Member, Department Administrative Committee during 01 Apr 2019 - 11 Jun 2021 MMED, IIT Roorkee.
8. Member, Department Faculty Search Committee during 09 Feb 2020 - 08 Feb 2021 MMED, IIT Roorkee.
9. Member, Advisory Committee, Institute Instrumentation Centre during 09 Aug 2012 - 06 Aug 2014, IIT Roorkee.
10. Member, Department Faculty Assessment Committee 01 Apr 2019 - 31 Mar 2022 MMED, IIT Roorkee.
11. Member, Senate, IIT Roorkee.
12. Member, Internal Complaints Committee during 01 Apr 2020 – Present, IIT Roorkee.
13. Member, Department Research Committee during 03 May 2021 – Present MMED, IIT Roorkee.
14. Member, Department Space Management Committee during 01 Jan 2020 – Present MMED, IIT Roorkee.
15. Member, Department Policy Committee during 01 Jan 2020 – Present MMED, IIT Roorkee