Curriculum Vitae

(Updated Jan. 2019)

Name: **Dr. Tata Narasinga Rao**
Scientist 'G' & Associate Director

Address: International Advanced Research Centre for
Powder Metallurgy & New Materials (**ARCI**)
Balapur P.O.
Hyderabad-500005
India
Phone (office): +91-40-24441077
Fax: +91-40-24442699
e-mail: tata@arci.res.in

AWARDS / HONOURS:

1. **Materials Research Society of India (MRSI) award, 2009.**
2. **FAPCCI Excellence Award (2011) for contribution as an outstanding scientist or engineer for the benefit of industry, trade or Agriculture (received from Chief Minister, AP)**
3. **Costal Chemical Research Award (CCRS) award-2013 in research category**
4. **Tokyo University of Science (TUS) President Award-2014 to be received in April 2014 in Japan**
5. **Elected as Academician of Asia Pacific Academy of Materials (APAM)-2015.**
6. **Best Creative Design Exhibition Stall award at Bangalore Nano-2015 conference**
7. **Technology Day National Award-2016 (received from President of India)**
8. **Fellow of Telangana Academy of Sciences-2017**
9. **Fellow of AP Academy of Sciences-2017**
10. **Bangalore India Nano Innovation Award-2018 (receiver from Barataratna, Prof. CNR Rao)**

Past positions:

Team Leader: Center for Solar Energy Materials, ARCI
Team Leader, Center for Nanomaterials, ARCI
Lecturer: University of Tokyo, Japan
Post Doctoral Fellow: University of Tokyo, Japan
Research Associate: IIT-Madras, Chennai
Senior Research Fellow: Banaras Hindu University, Varanasi
Junior research Fellow: IIT-Madras
Guest Faculty : University of Hyderabad
Guest Faculty: IIT Hyderabad

Professional Accomplishments:

Number of publications: 124
Number of patents (issued/filed): 22
Highest cited paper: Cited 8233 (Scopus) times (No. 120 in the publications list)
H-Index: 42 (scopus)

Schalorships

- Junior Research Fellowship/ Ministry of Non-conventional Energy Sources, India (1988).
- Senior Research Fellowship/ Ministry of Non-conventional Energysources, India (1989).
- Research Associate/ Department of Science and Technology, India (1994).
- Post-doctoral Fellow/ Japan Society for the Promotion of Science, Japan (1996).
- MONBUSHO schalorship/ Ministry of Education-Science-Sports and Culture, Japan (1996).
- Post-doctoral Researcher/ New Energy and Industrial Technology Development Organization (NEDO) (2000).

Education & research experience:

[1] Scientist 'E' (2003-2008) & Scientist 'F' (October 2008-present)
Team Leader. Centre for Nanomaterials, ARCI
Address: International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), Balapur P.O., Hyderabad-500005, India
Research topics:

- Photocatalysis applications for self-cleaning textiles
- Li-ion Batteries & supercapacitors for EV applications
- Nanocrystalline ZnO varistors
- Nanosilver for Health applications
- Nanocrystalline Materials (novel synthesis methods and scaling-up)

[2] Guest faculty to IIT-Hyderabad and University of Hyderabad (past)
[3] Guest faculty to University of Hyderabad (past)

[4] Lecturer (October 2001-March 2003)
Address: Department of Applied Chemistry, Faculty of Engineering, The University of Tokyo, Tokyo 113, Japan.
Teaching: Physical Chemistry (3rd year B. Engg.)
Supervising: Ph. D (1), M. Engg (1), B. Engg (1)
Research topics

- Electroanalytical chemistry using conductive boron-doped diamond thin film electrodes
- Diamond microelectrodes and microelectrode arrays for sensor applications.
- Photoelectrochemistry and dyesensitized photovoltaics.
- Electrochemical reduction of CO_2.

[5] Postdoctoral Researcher (NEDO fellow) (January 2000-October 2001)
Address: Fujishima Laboratory, Department of Applied Chemistry, Faculty of Engineering, The University of Tokyo, Tokyo 113, Japan.
Research topics

- Electroanalytical chemistry using conductive boron-doped diamond thin film electrodes
- Diamond microelectrodes and microelectrode arrays for sensor applications.
- Photoelectrochemistry and dyesensitized photovoltaics.
- Electrochemical reduction of CO_2.

[6] Postdoctoral Researcher (JSPS project) (June 1998-December 1999)
Address: Fujishima Laboratory, Department of Applied Chemistry, Faculty of Engineering, The University of Tokyo, Tokyo 113, Japan.
Research topics

- Electroanalytical chemistry using conductive boron-doped diamond thin film electrodes
- Photoelectrochemistry and dyesensitized photovoltaics
- Diamond microelectrodes and microelectrode arrays for sensor applications.
- TiO_2 photocatalysis
- Elctrochemical reduction of CO_2

[7] MONBUSHO Research fellow (October 1996 to March 1998)
Address: Fujishima Laboratory, Department of Applied Chemistry, Faculty of Engineering, The University of Tokyo, Tokyo 113, Japan.
Research topics

- Photoelectrorheology of TiO_2-based electrorheological fluids
- Electrochemistry and Photoelectrochemistry of diamond electrodes.

[8] JSPS Postdoctoral Fellow (Jan. 1996 to April 1996)
Address: Fujishima Laboratory, Department of Applied Chemistry, Faculty of Engineering, The University of Tokyo, Tokyo 113, Japan.
Research topic:

- Photoelectrorheology of TiO_2-based electrorheological fluids.

[9] Postdoctoral Researcher (June 1994 to Jan 1996)
Address**:** Material Science Research Center, Indian Institute of Technology, Madras 600036, India
Research topics:

- Superconductivity
- Solid-state ionic conductors

[10] Ph.D. (1989-94)
Address: Department of Chemistry, Banaras Hindu University, Varanasi, UP, India
Thesis Title: Non-aqueous Photoelectrochemical Solar Cells Based on Sprayed and Particulate n-ZnO Thin Film Electrodes.

[11] Junior Research Fellow (1987-89)
Address**:** Material Science Research Center, Indian Institute of Technology, Madras 600036, India
Research topic: Photoelectrochemistry

[12] Master of Science (M. Sc.) (1985-87)
Division: First Class
Address: Department of Chemistry, Banaras Hindu University, Varanasi, UP, India
Major: Physical Chemistry

[13] Bachelor of Education (B. Ed.) (1984-85)
Division: First Class
Address: Regional College of Education, Mysore, India
Major subjects: Physics and Chemistry

[14] Bachelor of Science (B. Sc.) (1980-83)
Division: First Class

Address**:** Andhra University, Waltair, India
Subjects: Chemistry, Physics and Mathematics

[14] Other courses:
"HPLC: Fundamentals, Applications, and Troubleshooting" 2000 Pittsburgh Conference & Exposition on Analytical Chemistry and Applied Spectroscopy Continuing Education Program, Conducted on March 14, 2000 at New Orleans.

List of Publications

Papers published:

1. Lal bahadur and **Tata N. Rao**, "Photoelectrochemical Studies of Cobalt doped ZnO Sprayed Thin Film Semiconductor Electrodes in Acetonitrile Medium" *Sol. Energy Mater. Sol. Cells.*, 27 (1992) 347.

2. Lal bahadur, J.P.Panday, and **Tata N. Rao**, "Photoelectrochemistry of ZnO Thin Film Electrode Sensitized by an Oxouranium (VI) Complex in an Acetonitrile Photocell" *Proc. Indian Acad. Sci. (Chem. Sci.)*,105 Nos.4/5 (1993)235.

3. Lal bahadur, **Tata N. Rao** and J.P.Panday, "extension of the spectral response of Sprayed ZnO Thin Film Electrodes Induced by Nickel and Cobalt Doping" *Semicond. Sci. Technol.*, 9, (1994) 275.

4. K. V. G. Kutty, C. K. Mathews, **Tata N. Rao** and U. V. Varadaraju, "Oxide ion conductivity in some substituted rare earth pyrozirconates" *Solid State Ionics.* 80 (1995) 99.

5. Lal bahadur and **Tata N. Rao**, "Photoelectrochemical investigations on particulate ZnO thin film electrodes in non-aqueous solvents" *J. Photochem. Photobiol. A:Chem* 91 (1995) 233.

6. **Tata N. Rao** and Lal bahadur, "Photoelectrochemical studies of dye sensitized particulate ZnO thin film electrodes" *J. Electrochem.soc.*, 144, No. 1 (1997) 179.

7. Y. Komoda, **Tata N. Rao** and A. Fujishima, "Photoelectrorheology of TiO_2 Nanoparticle Suspensions" *Langmuir* 13 (1997) 1371.

8. **Tata N. Rao,** Y. Komoda and A. Fujishima "Photoeffects on Electrorheological Properties of TiO_2 Particle Suspensions" *Chemistry Letters* (1997) 307.

9. N. Sakai, Y. Komoda, **Tata N. Rao** and A. Fujishima "Effect of adsorbed water on the photoelectrorheology of TiO_2 particle suspensions" J. Electroanal. Chem., 445 (1998) 1.

10. Y. Komoda, N. Sakai, **Tata N. Rao**, D. A. Tryk and A. Fujishima "Photoelectrorheological phenomena involving TiO_2 particle suspensions" *Langmuir* , 14 (1998) 1081.

11. Y. Komoda, **Tata N. Rao**, D. A. Tryk, A. Fujishima, "Influence of the rotation rate of a rotary viscometer on the photoelectrorheologial properties of TiO_2 particle suspensions" *J. Electroanal. Chem*., 459 (1998) 155.

12. **Tata N. Rao**, D. A. Tryk, K. Hashimoto, A. Fujishima, "Band-edge movements of

semiconducting diamond in aqueous electrolyte induced by anodic surface treatment" *J. Electrochem. Soc.,* 146 (1999) 680.

13. **Tata N. Rao**, I. Yagi, T. Miwa, D. A. Tryk and A. Fujishima, "Electrochemical oxidation of NADH at highly boron-doped diamond electrodes" *Anal. Chem*., 71 (1999) 2506.

14. B. V. Sarada, **Tata N. Rao**, D. A. Tryk, A. Fujishima, "Electrochemical characterization of highly boron-doped diamond microelectrodes in aqueous electrolytes" *J. Electrochem. Soc*., 146 (1999)1469.

15. Y. Maeda, K. Sato, R. Ramaraj, **Tata N. Rao**, D. A. Tryk and A. Fujishima, "The electrochemical response of highly boron-doped conductive diamond electrodes to Ce^{3+} ions in aqueous solution" *Electrochimica Acta* 44 (1999) 3441.

16. A. Fujishima, **Tata N. Rao**, E. Popa, B. V. Sarada, I. Yagi, D. A. Tryk, "Electroanalysis of dopamine and NADH at conductive diamond electrodes*" J. Electroanal*. Chem., 473 (1999) 179. Cited:

17. B. V. Sarada, **Tata N. Rao**, D. A. Tryk and A. Fujishima, "Electrochemical detection of serotonin at diamond electrode." *Chem. Lett.*, (1999) 1213.

18. K. Honda, **Tata N. Rao**, D. A. Tryk and A. Fujishima, M. Watanabe, K. Yasui and H. Masuda, "Electrochemical characterization of nanoporous honeycomb diamond electrode as an electrical double-layer capacitor" *J. Electrochem. Soc*., 147 (2000) 659.

19. B. V. Sarada, **Tata N. Rao**, D. A. Tryk and A. Fujishima, "Electrochemical oxidation of histamine and serotonin at highly boron-doped diamond electrodes" *Anal. Chem*., 72 (2000) 1632.

20. H. Masuda, M. Watanabe, K. Yasui, D. A. Tryk, **Tata N. Rao** and A. Fujishima, "Fabrication of Nanostructured Diamond Honeycomb Film" *Advanced Materials*, 12 (2000) 444.

21. **Tata N. Rao**, B. V. Sarada, D. A. Tryk and A. Fujishima, "Electroanalytical study of sulfa drugs at diamond electrodes and their determination by HPLC with amperometric detection" *J. Electroanal*. Chem.,491 (2000) 175.

22. M. Yoshimura, K. Honda, R. Uchikado, T. Kondo, **Tata N. Rao**, D. A. Tryk, A. Fujishima, Y. Sakamoto, K. Yasui and H. Masuda, "Electrochemical Characterization of Nanoporous Honeycomb Diamond Electrodes in Nonaqueous Electrolytes" *Diamond and Related Materials*, 10 (2001) 620.

23. H. Masuda, K. Yasui, M. Waanabe, K. Nishio, **Tata N. Rao** and A. Fujishima, "Fabrication of ordered diamond/metal nanocomposite structures" *Chem. Lett*. (2000) 1112.

24. R. Uchikado, **Tata N. Rao**, D. A. Tryk and A. Fujishima, "Metal-modified electrode as an electrochemical detector for glucose" *Chem. Lett*., (2001) 144 .

25. H. Masuda, T. Yanagishita, K. Yasui, K. Nishio, I. Yagi, **Tata N. Rao** and A. Fujishima, "Synthesis of well-aligned diamond nanocylinders" *Adv. Mat.,* 13 (2001) 247.

26. D. A. Tryk, K. Tsunozaki, **Tata N. Rao** and A. Fujishima, "Relationships between surface

character and electrochemical processes on diamond electrodes: dual roles of surface termination and near-surface hydrogen" *Diamond and Related Materials*, 10 (2001) 1804.

27. N. Spataru, **Tata N. Rao**, D. A. Tryk and A. Fujishima, "Determination of nitrite and nitrogen oxides by anodic voltammetry at conductive diamond electrodes." *J. Electrochem. Soc.*, 148 (2001) E112.

28. K. Honda, **Tata N. Rao**, D. A. Tryk and A. Fujishima, M. Watanabe, K. Yasui and H. Masuda, "Impedance characteristics of the nanoporous honeycomb diamond electrodes for electrical double layer capacitor applications." *J. Electrochem. Soc.*, 148 (2001) A668.

29. K. Honda, M. Yoshimura, **Tata N. Rao**, D. A. Tryk and A. Fujishima, K. Yasui, Y. Sakamoto, K. Nishio and H. Masuda, "Electrochemical properties of Pt-modified nanohoneycomb diamond electrodes" *J. Electroanal. Chem*., 514 (2001) 35.

30. H. Masuda, M. Watanabe, K. Yasui, K. Nishio, M. Nakao, T. Tamamura, **Tata N. Rao** and A. Fujishima, "Fabrication of through-hole membranes by oxygen plasma etching using anodic porous alumina mask" *Electrochem. Solid-State Lett*., 4 (2001) G101.

31. M. Yoshimura, K. Honda, R. Uchikado, T. Kondo, **Tata N. Rao**, D. A. Tryk, A. Fujishima, Y. Sakamoto, K. Yasui and H. Masuda, "Factors controlling the electrochemical potential window for diamond electrodes in non-aqueous electrolytes" *Diamond and Related Materials*, 11 (2002) 67.

32. C. Terashima, **Tata N. Rao**, B. V. Sarada, D. A. Tryk and A. Fujishima, "Electrochemical oxidation of chlorophenols at boron-doped diamond electrode and their determination by high-performance liquid chromatography with amperometric detection" *Anal. Chem.,* 74 (2002) 895.

33. T. A. Ivandini, B. V. Sarada, C. Terashima, **Tata N. Rao**, D. A. Tryk and A. Fujishima, "Electrochemical detection of tricyclic antidepressant drugs by HPLC using highly boron-doped diamond eletrode" *J. Electroanal. Chem.,* 521 (2002) 117.

34. **Tata N. Rao**, B. H. Loo, B. V. Sarada, C. Terashima and A. Fujishima, "Electrochemical detection of carbamate pesticides at conductive diamond electrodes" *Anal Chem.,* 74 (2002) 1578.

35. T. Kondo, .Y Einaga, B. V. Sarada, **Tata. N. Rao** D. A. Tryk, and A. Fujishima, "Homoepitaxial single-crystal boron-doped diamond electrodes for electroanalysis" *J. Electrochem. Soc,* 149 (2002) E179.

36. K. Ohnishi, Y. Einaga, H. Notsu, C. Terashima, **Tata N. Rao**, S-G. Park and A. Fujishima, "Electrochemical glucose detection using nickel-implanted boron-doped diamond electrodes" *Electrochem. Solid-State Lett*., 5 (2002) D1-D3.

37. K. Tsunozaki, Y. Einaga, **Tata N. Rao** and A. Fujishima, "Fabrication and electrochemical characterization of boron-doped diamond microdisc array electrodes", *Chem. Lett.,* (2002) 502.

38. M. Yoshimura, K. Honda, T. Kondo, **Tata N. Rao**, D. A. Tryk, A. Fujishima, "Electrochemical

Examination of the Ascorbic Acid Radical Anion in Non-Aqueous Electrolyte" *Electrochim. Acta*, 47 (2002) 4387.

39. K. Honda, M. Yoshimura, R. Uchikado, T. Kondo, **Tata N. Rao**, D. A. Tryk, A. Fujishima, M. Watanabe, K. Yasui, H. Masuda, "Electrochemical Characteristics for redox systems at nano-honeycomb diamond" *Electrochim. Acta*, 47 (2002) 4373.

40. O. Chailapakul, W. Siangproh, B. V. Sarada, C. Terashima, **Tata N. Rao**, D. A. Tryk and A. Fujishima, "The electrochemical oxidation of homocysteine at boron-doped diamond electrodes with application to HPLC amperometric detection" *Analyst,* 127 (2002) 1164.

41. C. Terashima, **Tata N. Rao**, B. V. Sarada and A. Fujishima, "Amperometric Detection of Oxidized and Reduced Glutathione at Anodically Pretreated Diamond Electrodes" *Chem. Lett*. 32 (2003) 136.

42. H. Olivia, B. V. Sarada, D. Shin, **Tata N. Rao**, and A. Fujishima, "Selective amperometric detection of dopamine using OPPy-modified diamond microsensor system" Analyst, 127 (1572) 2002.

43. C. Terashima, **Tata N. Rao**, B. V. Sarada N. Spataru and A. Fujishima, Electrodeposition of Hydrous Iridium Oxide on Conductive Diamond Electrodes for Catalytic Sensor Applications" *J. Electroanal. Chem*., 544 (2003) 65.

44. K. Honda, M. Yoshimura, **Tata N. Rao**, and A. Fujishima, "Electrogenerated chemiluminescence of the ruthenium tris(2,2')bipyridyl/amines system on boron-doped diamond electrode" *J. Phys. Chem*., 107 (2003) 1653.

45. C. Terashima, **Tata N. Rao**, B. V. Sarada and A. Fujishima, "Direct electrochemical oxidation of disulfides at boron-doped diamond electrodes" *Anal. Chem*., 75 (2003) 1564.

46. T. A. Ivandini, B. V. Sarada, C. Terashima, **Tata. N. Rao**, D. A. Tryk, H. Ishiguro, Y. Kubota and A. Fujishima, Gradient HPLC of Leucine-Enkephalin peptide and its metabolites by electrochemical detection using highly boron-doped diamond electrode, *J. Chromatography B*, 791 (2003) 63.

47. N. Spataru, K. Tokuhiro, C. Terashima, **Tata N. Rao** and A. Fujishima, "Electrochemical reduction of carbon dioxide at ruthenium dioxide deposited on boron-doped diamond" *J. Appl. Electrochem*. 33 (2003) 1205.

48. T. A. Ivandini, B. V. Sarada, **Tata. N. Rao,** A. Fujishima, "Electrochemical oxidation of underivatized nucleic acids at highly boron-doped diamond" *Analyst,* 128 (2003) 924.

49. J. F. Zhi, H. B. Wang, T. Nakashima, **Tata N. Rao** and A. Fujishima, "lectrochemical incineration of organic pollutants on boron-doped diamond electrode. Evidance for direct electrochemical oxidation pathway", J. Phys. Chem., 107 (2003) 13389.

50. X. T. Zhang, I. Sutanto, T. Taguchi, Q. B. Meng, **Tata N. Rao**, A, Fujishima, H. Watanabe, T. Nakamori and M. Uragami, "Al_2O_3-coated nanoporous TiO_2 electrode for solid-state dye-sensitized solar cell" Sol. Energ. Mat. Sol. Cells, 80 (2003) 315.

51. T. Taguchi, X. T. Zhang, I. Sutanto, K. Tokuhiro,**Tata N. Rao**, H. Watanabe, T. Nakamori and

M. Uragami and A. Fujishima, "Improving the performance of solid-state dye-sensitized solar cell using MgO-coated TiO_2 nanoporous film" Chem. Commun. 19 (2003) 2480.

52. L. Ouattara, I. Duo, T. Diaco, A. Ivandini, K. Honda, **Tata N. Rao**, A. Fujishima and Ch. Comninellis, "Electrochemical oxidation of ethylenediaminetetraacetic acid (EDTA) on BDD electrodes: Applications to waste water treatment" *New Diamond and Frontier Carbon Technology,* 13 (2003) 97.

53. M. Komatsu, **Tata N. Rao**, A. Fujishima, "Detection of hydroxyl radicals formed on an anodically polarized diamond electrode surface in aqueous media" Chem. Lett., 32 (2003) 396.

54. Q. B. Meng, K. Takahashi, X. T. Zhang, I. Sutanto, **Tata N. Rao**, A. Fujishima, H. Watanabe, T. Nakamori and M. Uragami, "Fabrication of an efficient solid-state dye sensitized solar cell", Langmuir, 19 (2003) 3572.

55. T.A. Ivandini, **T. N. Rao**, A. Fujishima and Y. Einaga, "Electrochemical oxidation of oxalic acid at highly boron-doped diamond electrodes", ANALYTICAL CHEMISTRY 78 (2006) 3467-3471.

56. R.H. Tian, **T.N. Rao**, Y. Einaga and J.F. Zhi, "Construction of two-dimensional arrays gold nanoparticles monolayer onto boron-doped diamond electrode surfaces" CHEMISTRY OF MATERIALS 18 (2006) 939-945.

57. T.A. Ivandini, K. Honda, **T. N. Rao**, A. Fujishima, Y. Einaga, "Simultaneous detection of Purinr and Pyrimidine at highly boron-doped diamond electrodes by using liquid chromatography" Talanta 71 (2007) 648-655.

58. Dibyendu Chakravarty, S.Bysakh, K.Muraleedharan. **T.N.Rao** and R.Sundaresan, "Spark plasma sintering of MgO doped alumina with high hardness and fracture toughness" Journal of the American Ceramic Society, 91[1], 213-218, 2008.

59. Kaliyan Hembram, R. Vijay, Y. S. Rao and **T. N. Rao** "Doped Nanocrystalline ZnO Powders for Non-linear Resistor Applications by Spray Pyrolysis Method" Journal of Nanoscience and Nanotechnology 9 (2009) 4376.

60. D. Chakravarty, H. Ramesh and **Tata . N. Rao**, "High strength porous alumina by spark plasma sintering" Journal of the European Ceramic Society 29 (2009) 1361.

61. R. Subasri, M. Asha, K. Hembram, G.V.N. Rao and **T. N. Rao**, " Microwave sintering of doped nanocrystalline ZnO and characterization for varistor applications, Materials Chemistry and Physics 124 (2010) 63.

62. G. Sundararajan and **Tata N. Rao**, "Commercial prospects for nanomaterials in India, Journal of Indian Institute of Science" J. Indian Institute of Science, 89 (2009) 35.

63. R. Janardhanan, K. Murugan, H. Neha, **Tata N. Rao**, "Synthesis and surface chemistry of nanosilver particles" Polyhedron 12 (2009) 2522.

64. K. Madhav Reddy, **T.N. Rao**, K. Radha and J. Joardar, "Nanostructured Tungsten Carbides by Thermochemical Processing", Journal of Alloys and Compounds, 494 (2010) 404.

65. K. Madhav Reddy, **T.N. Rao**, J. Revathi and J. Joardar, "Structural stability of α/β-Mo_2C during thermochemical processing", Journal of Alloys and Compounds, 494 (2010) 396.

66. B.V. Sarada, C.L.P. Pavithra, M. Ramakrishna, **Tata N. Rao** and G. Sundararajan, Highly (111) Textured copper foils with high hardness and high electrical conductivity by pulse reverse electrodeposition, Electrochemical and Solid State Letters, 13 (2010) D40.

67. K. Murugan, **Tata N. Rao**, A.S. Gandhi and B.S. Murthy, "Effect of aggregation of methylene blue dye on TiO2 surface in self cleaning studies", Catalysis Communications, 11 (2010) 518.

68. G. Sundararajan and **Tata N. Rao**, Nanomaterials: Application development at ARCI, Nano Digest, 2 (2010) 44.

69. K. Murugan, **Tata N. Rao**, K. Radha and Hina Gokhale, "Microwave plasma process optimization to produce nano titania through design of experiments" Materials and Manufacturing Processes 26 (2011) 803 .

70. N.Y. Hebalkar, S. Acharya and **T.N. Rao**, Preparation of bi-functional silica particles for antibacterial and sef-cleaning surfaces, J. Colloid & Interface, 364 (2011) 24.

71. K. Murugan, **T.N. Rao**, GVN Rao, AS Gandhi, BS Murty, Effect of dehydration rate on non-hydrolytic TiO2 thin film processing: Structure, optical and photocatalytic performance studies, Materials Chem. & Physics, 129 (2011) 810.

72. D. Chakravarty, BV Sarada, SB Chandrasekhar, K. Saravanan and **T.N. Rao**, A novel method of fabricating porous silicon, Mater. Sci. Engg. A, 528 (2011) 7831.

73. V. Balek, **T. N. Rao**, D.A. Tryk, A. Fujishima, Diffusion structural diagnostics of polycrystalline boron-doped diamond films, Thermochimica Acta, 524 (2011) 104.

74. K. Hembram, D. Sivaprahasam and **Tata N. Rao**, "Combustion synthesis of doped nanocrystalline ZnO powders for varistor appliations" J. European Ceramic Society, 31 (2011) 1905.

75. K. Nischala, **Tata N. Rao**, and Neha Hebalkar, "Silica-silver core shell particles for antibacterial textile application" Colloids & Surfaces B-Biointerfaces, 82 (2011) 203.

76. K. M. Reddy, **Tata N. Rao** and J. Joardar, "Stability of nanostructured W-C phases during carburization of WO3" Materials Chemistry and Physics, 128 (2011) 121.

77. R. Subasri, M. Tripathi, K. Murugan, J. Revathi, G.V.N. Rao and **Tata N. Rao**, " Investigations on the photocatalytic activity of sol-gel derived plain and Fe3+/Nb5+-doped titania coatings on glass substrates" Materials Chemistry and Physics 124 (2010) 63.

78. K. Wegner, B. Schimmoeller, B. Thiebaut, C. Fernandez and **Tata N. Rao**, KONA Powder and Particle Journal, (2011)

79. A, Bhaskar, M. Deepa, **T.N. Rao** and U.V. Varadaraju "Enhanced Nanoscale Conduction Capability of a MoO_2/Grapheme Composite for High Performance Anodes in Li ion Batteries", Journal of Power Sources 216 (2012) 169.

80. M. Chandra Sekhara Reddy, V. Vasudeva Rao, **T.N. Rao** and L. Syam Sundar, "Enhancement of Convective Heat Transfer Coefficient with TiO_2 Nanofluid in a Double Pipe Heat Exchanger", International Journal of Nanotechnology and Applications, Vol. 5, p 59-68, 2011.

81. S. Anadan, **T.N. Rao**, M. Sathis, D. Rangappa, I. Honma, M. Miyauchi, Superhydrophilic grapheme-loaded TiO2 thin film for self-cleaning applications, ACS Applied Materials & Interfaces, 5 (2013) 207.

82. A. Bhaskar, M. Deepa, **Tata. N. Rao** and U.V. Varadaraju, In-situ carbon coated Li2MnSiO4/C composites as cathodes for enhanced performance Li=ion batteries, , J. Electrochem. Soc., 159 (2012) A1954.

83. A. Bhaskar, M. Deepa and **Tata N. Rao**, MnO2/Multiwalled carbon nanotubes hybrid for use as a Li ion battery anode, ACS Applied Meterials & Interfaces, 5 (2013) 2555.

84. S. Sarma and **Tata N. Rao,** A novel method for measurement of porosity in nanofiber mat using pycnometer in filtration, Journal of Engineered fibers and fabrics (Accepted).

85. S. Anandan, **T.N. Rao**, R. Gopalan and Y. Ikuma, Fabrication of visible light driven N-doped ordered mesoporous TiO2 photocatalysts and their photocatalytic applications, J. Nanoscience & Nanotechnology, **J. Nanosci. Nanotechnol**. 13 (2013) 1-6.

86. K. Hembram, D. Sivaprahasam. K. Wegner and **T. N. Rao**, Large-scale manufacture of ZnO nanorods by flame spray pyrolysis, **J. Nanopartcile Research**, 15 (2013) 1461.

87. **Tata N. Rao**, and Raju Prakash: Nano Batteries: Future of Automotive Transportation, Nano Digest, 4 (3013) 28.

88. K. Murugan, R. Subasri, **Tata N Rao**, A.S. Gandhi and B.S. Murthy, Synthesis, Characterization and demonstration of self-cleaning TiO2 coatings on glass and ceramic tiles. Progress in Organic Coatings, 76 (2013)1756.

89. Ch L. P. Pavithra B.V. Sarada R.V. Koteswararao, **Tata N. Rao**, and G. Sundararajan, A new electrochemical approach for the synthesis of copper-graphene composite foils with high hardness, SCIENTIFIC REPORTS, DOI:10.1038/srep04049 (2014).

90. K.H. Anulekha, S.S.Chandra, V. Sritharan and **Tata N. Rao**, Fabrication and Surface Functionalization of Electrospun Polystyrene Submicron Fibres with Controllable Surface Roughness, RSC Advances 4, 12188-12197 (2014).

91. K.H. Anulekha, S.S. Chandra, and **Tata N. Rao**, Donut-shaped Li4Ti5)12 structures as a high performance anode material for Li ion batteries, **Small** DOI:10.1002/ssmall.201303894.

92. S. Bhuvaneswari, P.M. Pratheeksha, S. Anandan, D. Rangappa, R. Gopalan, and **Tata N. Rao**, Efficient reduced graphene oxide grafted porous Fe3O4 composite as a high performance anode materials for Li ion batteries., **Phys. Chem. Chem. Phys**, 16, 5284-94, 2014..

93. SB Chandrasekhar, SS Sarma, M. Ramakrishna, PS babu, **Tata N Rao**, BP. Kashyap, Microstructure properties of hot extruded Cu-1wt% Al2O3 nano-composites synthesized by various techniques., **Materials Science and Engineering**, 53 (2014) 46.

94. K.H. Anulekha, S.S. Chandra, and **Tata N. Rao**, Electrochemical performance of Lithium Titanate submicron rods synthesized by sol gel/electrospinning, **Electroanalysis,** DOI: 10.1002/elan.2004003.

95. A. Bhaskar, M. Deepa, M.Ramakrishna and **Tata N. Rao**, Poly (3,4 ethylenedioxy-thiophene) sheath over a SnO2 hollow spheres/graphene oxide hybrid for a durable anode in Li ion batteries, **J. Phys. Chem. C,** 118 (2014) 7296.

96. A. Bhaskar, M. Deepa, and **Tata N. Rao**, Size-controlled SnO2 hollow spheres via a template free approach as anodes for Li-ion batteries, **Nanoscale,** 6 (2014) 10762.

97. Sangeetha Aula, Samyuktha Lakkireddy, Swamy AVN, Atya Kapley,Kaiser Jamil, **Narasinga Rao Tata** and Kaliyan Hembram, Biological interactions in vitro of zinc oxide nanoparticles of different characteristics, IOP, **Materials Research Express** 1 (2014) 035041.

98. A. Bhaskar, M. Deepa, and **Tata N. Rao**, Tin Disulfide Nanoflowers versus Nanosheets as Anodes in Lithium-ion Batteries: How the Nanostructure Controls Performance, Electrochimica Acta, 184 (2015) 239.

99. K. Hembram, **Tata N Rao**, RS Srinivasa, AR Kulkarni, High performance varistors prepared from doped ZnO nanopowders made by pilot-scale flame spray pyrolyzer: Sintering, microstructure and properties, **J. European Ceramic Society**, 35 (2015) 3535.

100. R. Kumar, S. Anandan, K. Hembram and **Tata N. Rao**, Efficient ZnO-based visible light driven photocatalyst for antibacterial applications, **ACS Applied Meterials & Interfaces**, 6 (2014) 13138

101. Raju Kumar, D. Navadeepthy, K. Hembram, **T. N. Rao**, S. Anandan, "Visible-light induced photocatalytic disinfection of *E.coli* pathogens with Fe^{3+}-grafted ZnO nanoparticles" ***Energy and Environment Focus*** *(in press)*.

102. Ch. L. P. Pavitra, B.V. Srada, R. Koteswara Rao, M. Rama Krishna, G. Ravichandra, **Tata N. Rao** and G. Sundararajan, "Controllable crystallographic texture in copper foils exhibiting enhanced mechanical and electrical properties by pulse reverse electrodeposition" **Crystal Growth and Design**, 15 (2015) 4448.

103. SB Chandrasekhar, PN Wasekar, M. Ramakrishna, PS Bapu, **Tata N Rao** and BP Kashyap, Dynamic strain ageing in fine grained Cu-1 wt%Al2O3 composite processed by two step ball milling and spark plasma sintering, **J. Alloys & Compounds**, 656 (2016) 423.

104. Ch. L. P. Pavithra, B. V. Sarada, K. V. Rajulapati, **Tata N. Rao** and G. Sundararajan, Process Optimization for Pulse Reverse Electrodeposition of Graphene Reinforced Copper Nanocomposites, **Materials and Manufacturing Process,** 31 (2016) 1439**.**

105. M. Nagini, A. Jyothirmayi, **Tata N Rao**, R. Vijay, A.V. Reddy, V. Koteswara Rao, and G. Sundararajan, Influence of dispersoids on corrosion behavior of oxide dispersion strengthened 18 Cr steels made by high energy milling, **J. Mat. Engg. & Performance** (published online: DOI: 10.1007/s11665-015-1859-5.

106. S. Sakthivel, M. Karthik and **Tata N. Rao**, Nanotechnology for concentrated solar thermal applications, **Nanotech Insights**, 7 (2016) 43.

107. R. Kumar, G. Shiva Kumar, S.K. Janardhan Reddy, Tata N. Rao, S.V. Joshi and S. Anandan, One step route for the development of in-situ co-catalyst-modified Ti3+ self-doped TiO2 for improved visible-light photocatalytic activity, **ACS Applied Materials and Interfaces**, 8 (2016) 27642.

108. E. Hari Mohan, B.V. Sarada, RVR, Naidu, G. Sailan, A.K. Haridas., BV Appa Rao and **Tata N Rao**, Graphene-Modified electrodeposited dendritic porous tin structures as binder-free anodes for high performance Li-S batteries., **Electrochimica Acta**, 219 (2016) 701.

109. PM Pratheeksha, EH Mohan, BV Sarada, M. Ramakrishna, K. Hembram, PVV Srinivas, PJ.Daniel, **Tata N. Rao**, and S. Anandan, Development of novel carbon coating strategy for producing core-shell structured carbon coated LiFePO4 for an improved Li-ion battery performance, **Phys, Chem. Chem. Phys**. 19 (2017) 175.

110. AK. Haridas, C.S. Sharma, H. Neha and **Tata N Rao**, Nano-grained SnO2/LTO composite hollow fibers via sol-gel/electrospinning as anode material for Li ion batteries, **Materials Today Energy**, 4 (2017) 14.

111. P. Tejassvi, S.S. Sarma, H. Neha, S. Anandan, K. Mohan, and **Tata N. Rao**, Enhanced electrochemical performance SiO2 nanofibers as Binder-free Anode**, Chemistry Letters** 46:7(2017) 1007..

112. K. Nanaji, A. Jyothirmayi, U.V. Varadaraju, **T. N. Rao**, and S. Anandan,, Facile synthesis of mesoporous carbon from furfuryl alcohol-butanol system by EISA process for supercapacitors with enhanced rate capability, ***Journal of Alloys and Compounds***, 723 (2017) 488.

113. D.K. Kaushik, **Tata N. Rao**, and A. Subrahmanyam, "Studies on the disorder in DC magnetron sputtered Cu2ZnSnS4 (CZTS) thin films grown in sulfide plasma", **Surface & coatings Technology,** 314 (2017) 85.

114. A.K. Haridas, C.S. Sharma, and **Tata N. Rao**, "Electrospun SnO2/LTO composite sub-micron dimpled spheres as high performance anode material for lithium ion batteries" **ECS Transactions**, 77 (2017) 339.

115. N.S. Anans, R.K. Dash. **Tata N. Rao**, and R.Vijay, "Effect of carbon nanotubes as reinforcement on the mechanical properties of aluminium-copper-magnesium alloy", **Journal of Materials Engineering and Performance**, 26 (2017) 3376.

116. P. SaiKarthik, S.B. Chandrasekhar, D. Chakravarthy, P.V.V. Srinivas, V.S.K. Chakravadhanula, **T.N. Rao,** "Propellant grade ultra fine aluminum powder by RF induction plasma", **Advanced Powder Technology**, 29 (2018) 804**.**

117. K. Hembram, **Tata N. Rao**, M. Ramakrishna, R.S. Srinivasa, A.R. Kulkarni, "A novel economical grain boundary engineered ultra-high performance ZnO varistor with lesser dopants**", J. European Ceramic Society,** 38 (2018) 5021.

118. M. Vijayakumar, R. Santhosh, J. Adduru, **Tata N. Rao**, M. Karthik, "Activated carbon fibers as high performance supercapacitor electrodes with commercial level mass loading" **Carbon** 140 (2018) 465.

119. M. Vijayakumar, J. Adduru, **Tata N. Rao**, M. Karthik, "Conversion of solar energy into electrical energy storage: supercapacitor as an ultrafast energy-storage device made from biodegradable agar-agar as a novel and low cost carbon precursor" **Global Challenges**, 2 (2018) 1.

120. T. Mitravinda, K. Nanaji, S. Anandan, A. Jyothirmayi, C.V.S. Kiran, C.S. Sharma and **Tata N. Rao**, "Facile synthesis of corn silk derived nanoporous carbon for an improved supercapacitor performance" **Journal of The Electrochemical Society**, 165 (2018) A3369.

121. E.H. Mohan, S. Anandan, B.V. Appa Rao, **Tata N. Rao**, "Neem leaves derived micro and mesoporous carbon as an efficient polysulfide inhibitor for sulfur cathode in a Li-S battery" **Chemistry Letters** 48 (2019) 62.

122. E. Harimohan, K. Nanaji, S. Anandan, BV Sarada, M. Ramakrishna, A. Jyothirmai, B.V. Appa Rao, and **Tata N. Rao**, One-step induced porous graphitic carbon sheets as supercapacitor electrode material with improved rate capability, **Materials Letters**, 236 (2019) 205. (to be printed in 2019).

123. K. Nanaji, U.V. Varadaraju , **Tata N. Rao**, S. Anandan "Robust, Environmentally Benign Synthesis of Nanoporous Graphene Sheets from Biowaste for Ultrafast Supercapacitor Application", **ACS Sustainable Chem. Eng**. 7 (2019) 2516.

124. K. Nanaji, E. Hari Mohan, B.V. Sarada, U.V. Varadaraju, **Tata N. Rao**, S. Anandan, "One step synthesized hierarchical spherical porous carbon as an efficient electrode materials for Lithium ion battery, **Materials Letters**, 237 (2019) 156.

125. M. Vijayakumar, D. Sri Rohita, **Tata N. Rao**, Mani Karthik, Electrode mass ratio impact on electrochemical capacitor performance, **Electrochimica Acta,** 298 (2019) 347**.**

Proceedings and reviews:

126. A. Fujishima and **Tata N. Rao**, "Recent advances in heterogeneous TiO_2 photocatalysis" *Proc. Indian Acad. Sci. (Chem. Sci.)* 109 (1997) 471.

127. A. Fujishima and **Tata N. Rao**, "Interfacial photochemistry: fundamentals and applications" *Pure & Appl. Chem*., 70 (1998) 2177.

128. A. Fujishima, D. A. Tryk and **Tata N. Rao**, "New Approaches in CO_2 reduction" *Studies in surface science and catalysis* , B. Delmon and J. T. Yates (Eds.) Vol 114, page 31, 1998 Elsevier Science B. V.

129. Y. Ohko, K. Ikeda, **Tata N. Rao**, K. Hashimoto and A. Fujishima, "Photocatalytic reaction kinetics on TiO_2 thinfilms under light-limited and mass transport-limited conditions" *Zeitschrift für Physikalische Chemie,* 213 (1999) S. 33.

130. B. V. Sarada, **Tata N. Rao**, D. A. Tryk and A. Fujishima, "Electroanalytical applications of conductive diamond electrodes" *New Diamond and Frontier Carbon Technology,* 9 (1999) 365.

131. **Tata N. Rao**, A. Fujishima, "Recent advances in electrochemistry of diamond" *Diamond and related materials*, 9 (2000) 384.

132. A. Fujishima, Tata N. Rao, and D. A. Tryk, "Titanium dioxide photocatalysis" *J. Photochem. Photobiol. C: Photochem. Reviews*, 1(2000) 1. Cited: 8233.

133. A. Fujishima, **Tata N. Rao**, and D. A. Tryk, "TiO_2 Photocatalysts and diamond Electrodes." *Electrochim. Acta*, 45 (2000) 4683.

134. A. Fujishima and **Tata N. Rao**, "New directions in structuring and electrochemical applications of boron-doped diamond thin films." *Diamond and Related Materials*, 10 (2001) 1799.

135. A. Fujishima, C. Terashima, K. Honda, B. V. Sarada, and **Tata N. Rao**, "Recent Progress in Electroanalytical Applications of Diamond Electrodes" *New Diamond and Frontier Carbon Technology,* 12 (2002) 73.

136. **Tata N. Rao**, T. A. Ivandini, C. Terashima, B. V. Sarada and A. Fujishima, "Applications of bare and modified diamond electrodes in electroanalysis" *New Diamond and Frontier Carbon Technology,* 13 (2003) 79.

137. M. Shastri, V. Gangaraju, N. Rani, E. Harimohan, Tata N. Rao, D. Rangappa, Spray drying combustion synthesis of LiNo0.45Mn2.45Co0.1O4/graphene nanocomposite and its electrochemical properties, **Materials Today: Proceedings** 4(2017) 12223.

Book chapters

138. **Tata N. Rao**, D. A. Tryk and A. Fujishima, "Applications of TiO_2 Photocatalysis" *Encyclopedia of Electrochemistry, Volume 6: Semiconductor Electrodes and Photoelectrochemistry,* Wiley-VCH, Eds. A.J. Bard and M. Stratmann, March 2002.

139. A. Fujishima, Y. Ohko and **Tata N. Rao**, "Photoelectrochemical Processes of Semiconductors," in "Photocatalysis Fundamentals and Applications," edited by M. Kaneko and I. Ohkura (2001).
140. G. Sundararajan and Tata N. Rao, "Current trends in nanomaterials research technology development and commercialization" Platinum Jubilee issue of Indian National Science Academy (INSA), 2009

Book edited:

1. Diamond Electrochemistry: Edited by A. Fujishima, Y. Einaga, **T. N. Rao** and D.A. Tryk, Co-published by Elsevier B.V. and BKC INC; Published in 2005

Patents

1. Analysis method using liquid chromatograph. **WO0167089A1**
2. Detection method of inspection compound, and diamond electrode and device used therefore. **JP2003121410A2**
3. Diamond electrode for measuring concentration of glucose and measuring method and instrument using the same. **JP2002310977A2, AU0188106A5, WO0225261A1**
4. Electrochemical assay using an electroconductive diamond-coated electrode, and electrochemical assay system based thereon. **EP1055926A2, EP1055926A3, TW0528867B**
5. Method for determining concentration of xanthin type compound and sensor for use therein. **WO0198766A1, AU0174581A5**
6. Thiol concentration measuring method and sensor used for the same, **JP2002189016A2**
7. An improved process for the preparation of doped zinc oxide Nanopowder useful for the preparation of varistors and an improved process for the preparation of varistors employing the said nanopowders, **Patent application No. 1669/DEL/2006**; **date of filing 20/07/06**
8. A process for the preparation of nanosilver and nanosilver-coated ceramic powders, **2786/DEL/2005**; date of filing 10/10/05
9. Novel ceramic materials having improved mechanical properties, a process for its preparation & a process for making cutting tools of such materials, **3396/DEL/2005**; **date of filing 19-12-2005**
10. An improved process for preparing nano tungsten carbide powder useful for fuel cell, Patent Application No. **81/Del/2007**

11. Improved method of producing highly stable aqueous nano titania suspension**, Patent Application No. 730/DEL.2009 date of filing April 9, 2009**
12. Novel copper foils having high hardness and electrical conductivity and a pulse reverse electrodeposition method for their preparation, **Patent application number 1028/DEL/2009, date of filing May 20, 2009.**
13. Improved process for the preparation of stable suspension of nanosilver particles having antibacterial activity. **Patent application number, 1835/DEL/2010 dated August 4, 2010.**

14. Improved process for the preparation of bi-functional silica particles useful for antibacterial and self-cleaning surface**, Patent application number 3071/DEL/2010, dtae: December 22, 2010**
15. An improved method for producing ZnO nanorods. **Patent application no. 2759/DEL/2010 dated 19/11/2010.**
16. An improved process for the preparation of nano silver coated ceramic candle filters **Patent application no. 1249/DEL/2011**, Date of filing: 28/04/2011
17. An improved method of preparing porous silicon compacts **Patent applications number, 912/DEL/2011, filed on 31-03-2011**
18. Method of producing multifunctional, self-assembled, mixed phase titania spheres, **Patent application No. 3777/DEL/2014**, filed on December 19, 2014.
19. Improved process for the preparation of stable suspension of nano silver particles having antibacterial activity. **UK Patent GB 2496089B Date: 18.06.2014**
20. Method of preparation of high performance ZnO Varistors and improved compositions. **Patent application, 2765/DEC/2015**.
21. A method of producing high performance lithium titanate anode material for lithium ion battery applications, **Indian Patent Application No. E-2/1972//2017/DEL**
22. Method of producing graphene like structured nanoporous carbon material from Jute stick based bio-waste for Energy Storage applications and the product thereof" **Indian Patent Appl. No. E-2/276//2018/DEL**
23. Method of producing nanostructured C-TiO_2 composite material for visible light active photocatalytic self-cleaning applications, **Indian Patent Application No. 201811011478** dated 28th March, 2018.