Dr. Atul Suresh Deshpande

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Education

 Ph.D : September 2001-June 2004, International Max Planck Research School (IMPRS) on Biomimetic Systems, Max Planck Institute of Colloids and interfaces, Potsdam, Germany.

Thesis title: Fabrication of porous metal oxides for catalytic applications using templating techniques

 M.Sc. (Inorganic Chemistry): August1997- June1999: Department of Chemistry, University of Pune, India

 B.Sc. (Chemistry) August1994- June 1997 Sir Parashurambhau College, Pune, India.

Professional positions

December 2019- till date : Associate Professor at Department of Materials Science and Metallurgical Engineering, Indian Institute of Technology Hyderabad, Hyderabad, India
December 2011- December 2019: Assistant Professor at Department of Materials Science and Metallurgical Engineering, Indian Institute of Technology Hyderabad, Hyderabad, India
August 2006- February 2011: Postdoctoral Fellow at the Forsyth Institute, Boston, US, till August 2007. Continued the same position at the School of Dental Medicine, University of Pittsburgh, Pittsburgh, US.
August 2004- April 2006: Postdoctoral fellow at the Department of Biomaterials, Max Planck Institute of Colloids and interfaces, Potsdam, Germany.
July1999-July 2001: Project assistant, the Physical and Materials Chemistry Division, National Chemical Laboratory, Pune.

Research Interests

Nanoparticle synthesis: Synthesis of novel multicomponent oxide (high entropy oxide) and high entropy alloy nanoparticles, their detailed structural analysis and analysis of their functional properties.
Carbon Materials: Generation of nanostructured carbon materials for energy storage applications
Biomaterials: Biomimetic approaches for the generation of materials for superhydrophobic surfaces and coatings

List of Publications and Patents:
Total number of Publications: 30; patents: 3
h-index: 18

Publications with IIT Hyderabad affiliations (with IITH student)

1. Single-phase Gd0.2La0.2Ce0.2Hf0.2Zr0.2O2 and Gd0.2La0.2Y0.2Hf0.2Zr0.2O2 nanoparticles as efficient photocatalysts for the reduction of Cr(VI) and degradation of methylene blue dye.Anandkumar M, Lathe A, Palve AM, Deshpande AS. ***Journal of Alloys and Compounds***. 850:156716, **2021**,. doi:10.1016/j.jallcom.2020.156716

2. In-situ formation of mesoporous SnO2@C nanocomposite electrode for supercapacitors.Rani MU, Naresh V, Damodar D, Muduli S, Martha SK, Deshpande AS. ***Electrochimica Acta***. 365:137284, **2021**,. doi:https://doi.org/10.1016/j.electacta.2020.137284

3. Corn husk derived activated carbon with enhanced electrochemical performance for high-voltage supercapacitors.Usha Rani M, Nanaji K, Rao TN, Deshpande AS. ***Journal of Power Sources***. 471 **2020**,. doi:10.1016/j.jpowsour.2020.228387

4. Wood-Derived Carbon Fibers Embedded with SnO x Nanoparticles as Anode Material for Lithium-Ion Batteries.Revathi J, Jyothirmayi A, Rao TN, Deshpande AS. ***Global Challenges***. 4(1):1900048, **2020**,. doi:10.1002/gch2.201900048

5. Structural and luminescent properties of Eu3+ doped multi-principal component Ce0.2Gd0.2Hf0.2La0.2Zr0.2O2 nanoparticles.Anandkumar M, Bagul PM, Deshpande AS. ***Journal of Alloys and Compounds***. 838 **2020**,. doi:10.1016/j.jallcom.2020.155595

6. Wetting Transition from Lotus Leaf to Rose Petal using Modified Fly Ash.Mahanta U, Khandelwal M, Deshpande AS. ***ChemistrySelect***. 4(27):7936-7942, **2019**,. doi:10.1002/slct.201901535

7. 3D printable SiO2 nanoparticle ink for patient specific bone regeneration.Roopavath UK, Soni R, Mahanta U, Deshpande AS, Rath SN. ***RSC Advances***. 9(41):23832-23842, **2019**,. doi:10.1039/c9ra03641e

8. Hard carbon derived from sepals of Palmyra palm fruit calyx as an anode for sodium-ion batteries.Damodar D, Ghosh S, Usha Rani M, Martha SK, Deshpande AS. ***Journal of Power Sources***. 438 **2019**,. doi:10.1016/j.jpowsour.2019.227008

9. Low temperature synthesis and characterization of single phase multi-component fluorite oxide nanoparticle sols.Anandkumar M, Bhattacharya S, Deshpande AS. ***RSC Advances***. 9(46):26825-26830, **2019**,. doi:10.1039/c9ra04636d

10. Near-Room-Temperature Synthesis of Sulfonated Carbon Nanoplates and Their Catalytic Application.Damodar D, Kunamalla A, Varkolu M, Maity SK, Deshpande AS. ***ACS Sustainable Chemistry and Engineering***. 7(15):12707-12717, **2019**,. doi:10.1021/acssuschemeng.8b06280

11. Sodium alginate/gelatin with silica nanoparticles a novel hydrogel for 3D printing.Soni R, Roopavath UK, Mahanta U, Deshpande AS, Rath SN. In: Sahulhameedu S. Shakya S. CJ, ed. *AIP Conference Proceedings*. Vol 1966. American Institute of Physics Inc.; 2018:020002. doi:10.1063/1.5038681

12. Nitrogen-doped graphene-like carbon nanosheets from commercial glue: morphology, phase evolution and Li-ion battery performance.Damodar D, Kumar SK, Martha SK, Deshpande AS. ***Dalton Transactions***. 47(35):12218-12227, **2018**,. doi:10.1039/C8DT01787E

13. Primary structure and phosphorylation of dentin matrix protein 1 (DMP1) and dentin phosphophoryn (DPP) uniquely determine their role in biomineralization.Deshpande AS, Fang P-A, Zhang X, Jayaraman T, Sfeir C, Beniash E. ***Biomacromolecules***. 12(8):2933-2945, **2011**,. doi:10.1021/bm2005214

14. Possible role of DMP1 in dentin mineralization.Beniash E, Deshpande AS, Fang PA, Lieb NS, Zhang X, Sfeir CS. ***Journal of Structural Biology***. 174(1):100-106, **2011**,. doi:10.1016/j.jsb.2010.11.013

15. Amelogenin-collagen interactions regulate calcium phosphate mineralization in vitro.Deshpande AS, Fang P-A, Simmer JP, Margolis HC, Beniash E. ***Journal of Biological Chemistry***. 285(25):19277-19287, **2010**,. doi:10.1074/jbc.M109.079939

16. Bioinspired synthesis of mineralized collagen fibrils.Deshpande AS, Beniash E. ***Crystal Growth and Design***. 8(8):3084-3090, **2008**,. doi:10.1021/cg800252f

17. Atomic-scale structure of nanocrystalline CeO2-ZrO2 oxides by total x-ray diffraction and pair distribution function analysis.Gateshki M, Niederberger M, Deshpande AS, Ren Y, Petkov V. ***Journal of Physics Condensed Matter***. 19(15) **2007**,. doi:10.1088/0953-8984/19/15/156205

18. Synthesis of mesoporous ceria zirconia beads.Deshpande AS, Niederberger M. ***Microporous and Mesoporous Materials***. 101(3):413-418, **2007**,. doi:10.1016/j.micromeso.2006.11.036

19. Hierarchically structured ceramics by high-precision nanoparticle casting of wood.Deshpande AS, Burgert I, Paris O. ***Small***. 2(8-9):994-998, **2006**,. doi:10.1002/smll.200600203

20. Controlled assembly of preformed ceria nanocrystals into highly ordered 30 nanostructures.Deshpande AS, Pinna N, Smarsly B, Antonietti M, Niederberger M. ***Small***. 1(3):313-316, **2005**,. doi:10.1002/smll.200400060

21. Steam reforming of methanol over Cu/ZrO2/CeO2 catalysts: A kinetic study.Mastalir A, Frank B, Szizybalski A, et al. ***Journal of Catalysis***. 230(2):464-475, **2005**,. doi:10.1016/j.jcat.2004.12.020

22. Titania and mixed titania/aluminum, gallium, or indium oxide spheres: Sol-gel/template synthesis and photocatalytic properties.Deshpande AS, Shchukin DG, Ustinovich E,

Antonietti M, Caruso RA. ***Advanced Functional Materials***. 15(2):239-245, **2005**,. doi:10.1002/adfm.200400220

23. Synthesis and characterization of stable and crystalline Ce 1-xZrxO2 nanoparticle sols.Deshpande AS, Pinna N, Beato P, Antonietti M, Niederberger M. ***Chemistry of Materials***. 16(13):2599-2604, **2004**,. doi:10.1021/cm040155w

24. Synthesis of nanosized Ce0.75Zr0.25O2 porous powders via an autoignition: Glycine nitrate process.Potdar HS, Deshpande SB, Khollam YB, Deshpande AS, Date SK. ***Materials Letters***. 57(5-6):1066-1071, **2003**,. doi:10.1016/S0167-577X(02)00932-1

25. A self-sustaining acid-base reaction in semi-aqueous media for synthesis of barium titanyl oxalate leading to BaTiO3 powders.Khollam YB, Deshpande AS, Potdar HS, Deshpande SB, Date SK, Patil AJ. ***Materials Letters***. 55(3):175-181, **2002**,. doi:10.1016/S0167-577X(01)00642-5

26. Preparation of ceria-zirconia (Ce0.75Zr0.25O2) powders by microwave-hydrothermal (MH) route.Potdar HS, Deshpande SB, Deshpande AS, et al. ***Materials Chemistry and Physics***. 74(3):306-312, **2002**,. doi:10.1016/S0254-0584(01)00485-0

27. Microwave-hydrothermal synthesis of equi-axed and submicron-sized BaTiO3 powders.Khollam YB, Deshpande AS, Patil AJ, Potdar HS, Deshpande SB, Date SK. ***Materials Chemistry and Physics***. 71(3):304-308, **2001**,. doi:10.1016/S0254-0584(01)00286-3

28. Synthesis of yttria stabilized cubic zirconia (YSZ) powders by microwave-hydrothermal route.Khollam YB, Deshpande AS, Patil AJ, Potdar HS, Deshpande SB, Date SK. ***Materials Chemistry and Physics***. 71(3):235-241, **2001**,. doi:10.1016/S0254-0584(01)00287-5

29. Improved chemical route for quantitative precipitation of lead zirconyl oxalate (PZO) leading to lead zirconate (PZ) powders.Deshpande AS, Khollam YB, Patil AJ, Deshpande SB, Potdar HS, Date SK. ***Materials Letters***. 51(2):161-171, **2001**,. doi:10.1016/S0167-577X(01)00284-1

30. Simplified chemical route for the synthesis of barium titanyl oxalate (BTO).Potdar HS, Deshpande SB, Deshpande AS, et al. ***International Journal of Inorganic Materials***. 3(7):613-623, **2001**,. doi:10.1016/S1466-6049(01)00168-4

31. Preparation and characterization of strontium zirconate (SrZrO3) fine powders.Potdar HS, Deshpande SB, Patil AJ, Deshpande AS, Khollam YB, Date SK. ***Materials Chemistry and Physics***. 65(2):178-185, **2000**,. doi:10.1016/S0254-0584(00)00238-8

Patents:

1. Improved process for Wood derived Carbon - Metal oxide composites prepared by nanocasting of wood for electrode materials in lithium ion batteries

Janardhanan Revathi, **Atul Suresh Deshpande**, Tata Narasinga Rao

Indian Pat. Appl. (2016) 201611034531

2. An improved process for the preparation of stable nano silver suspension having antimicrobial activity

Janardhanan Revathi, Nellipudi Satya Moulika, Avvaru Venkata Sai, **Atul Suresh Deshpande**, Karuppiah Murugan, Neha Yeshwanta Hebalkar, Ravula Vijay, Tata Narasinga Rao, Govindan Sundararajan

Indian Pat. Appl. (2016) 201611027145

3. An improved process for the preparation of barium titanyl oxalate (BTO).

Potdar, H.S., Desphande, S.B., Date, S.K., Khollam**,** Y.B., **Deshpande**, **A.S.,** Patil, A.J.,

Indian Pat. (2007), IN, 792/DEL/2001A, Patent No. 20071123.

Recent Talks and conference proceedings

1. **Atul Suresh Deshpande,** Damodar D, M. Usha rani, "Precursor dictated morphology control of nanostructured carbons" (Oral Presentation) **Carbon MEMS: New Horizons, Fourth International Carbon-MEMS Meeting, Hyderabad, December 2018**

Atul Suresh Deshpande, M. Anandkumar, Saswata Bhattachrya, Ranjith Ramadurai, "Entropy Stabilized Multicomponent Oxides: Synthesis and Structural Analysis" (Invited talk) **NMD-ATM 2016, IIT Kanpur, November 2016**

3. M. Anandkumar, **Atul Suresh Deshpande**, Saswata Bhattachrya, Ranjith Ramadurai, "Entropy stabilized rare-earth based oxide: Synthesis and Thermal Stability, (Oral presentation) **MRS fall meeting, November 2016**

4. Raghav Soni,Uday Roopavath, Urbashi Mahanta, **A. S. Deshpande***, S.N.Rath*

"Sodium alginate/gelatin with Silica nanoparticles a Novel Hydrogel for 3D-Printing" International Conference on Inventive Research in Material Science and Technology, Coimbatore, India (ICIRMCT 2018), **AIP conference Proceedings, 1966, 020002 (2018)** https://doi.org/10.1063/1.5038681