

SUDIP DASGUPTA

Assistant Professor

*Department of Ceramic Engineering
National Institute of Technology, Rourkela
Odisha-769008*

India

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EDUCATION

Ph.D., Materials Science, Washington State University, WA, USA, 2008

Thesis Title: Nanostructured Hydroxyapatite and Tricalcium Phosphate Based Ceramics for Protein Delivery and Bone Implant Using Microwave Sintering

GPA: 3.78/4.00

Advisor: Prof. Susmita Bose

• **M. Tech., Materials Science, Indian Institute of Technology, Kanpur, India, 2001–2003.**

Thesis Title: Preparation of Uniform Zirconia Nanoparticles and Their Dispersion in a Silica Film

(Advisor: Prof. D. C. Agrawal)

G.P.A: 3.32/4.00

• **B. Tech., Chemical Technology (Specialization in Ceramic Engineering), University of Calcutta, India, 1998–2001**

First Class

Marks: 69.7%

• **B. Sc., Chemistry (Honors), University of Calcutta, India, 1995–1998.**

First Class (Honors)

Marks: 62.75%

AWARDS AND HONORS

- Outstanding Research Paper Award, ISNM, MIT, USA, 2006
- John P. Hirth Outstanding Graduate Seminar Award, Pullman, WSU, USA, 2007
- Third best poster award in graduate student poster competition in MS&T 07, Detroit, MI, USA, 2007.
- Graduate Aptitude Test Examination (GATE) Fellowship, Ministry of Human Resources, Government of India, 2001 – 2003

PEER-REVIEW PUBLICATIONS

1. **Sudip Dasgupta** and Susmita Bose, “Reverse Micelle-Mediated Synthesis and Characterization of Tricalcium Phosphate Nanopowders for Bone Graft Applications”, *Journal of the American Ceramic Society*, 92, 2528-2536 (2009).

2. **Sudip Dasgupta**, Amit Bandyopadhyay, Susmita Bose, “Reverse micelle mediated synthesis of calcium phosphate nanocarriers for controlled release of bovine serum albumin” *Acta Biomaterialia*, **5**(8), pp. 3112-3121 (2009).
3. Abhijit Chanda, **Sudip Dasgupta**, Susmita Bose and Amit Bandyopadhyay, “Microwave sintering of pure and doped calcium phosphate ceramics,” *Materials Science and Engineering C*, **29**, pp. 1144-1149 (2009).
4. Susmita Bose, Ashis Banerjee, **Sudip Dasgupta** and Amit Bandyopadhyay, “Synthesis, Processing and Characterization of Mechanical and Biological Properties of Hydroxyapatite Whisker Reinforced Hydroxyapatite Composites,” *Journal of the American Ceramic Society*, **92** [2], pp. 323-330 (2009).
5. T.K.Parya, PK.Singh, Sudip Das Gupta, “Development of aluminium oxychloride bonded no cement high alumina castable”, *Indoceram*, [46\(4\),75-82, 2009](#)
6. Susmita Bose, **Sudip Dasgupta**, Solaiman Tarafder and Amit Bandyopadhyay “Microwave-processed nanocrystalline hydroxyapatite: Simultaneous enhancement of mechanical and biological properties”, *Acta Biomaterialia*, 6[9], 3782-3790 (2010)
7. **Sudip Dasgupta**, Shashwat S. Banerjee, Amit Bandyopadhyay, and Susmita Bose. “Zn and Mg Doped Hydroxyapatite Nanoparticles for Controlled Release of BSA Protein”, *Langmuir*, , 26 (7), 4958–4964 (2010)
8. Manjusha Chakraborty, **Sudip Dasgupta**, Somoshree Sengupta, , Jui Chakraborty, Debabrata Basu, “ Layered double hydroxide based nanocapsule as a reservoir of functional anions” *Transaction of the Indian Ceramic Society*, 69 (3, SI). pp. 153-163. ISSN 0371-750X, 2010.
9. Manjusha Chakraborty, **Sudip Dasgupta**, Poulomi Bose, Jui Chakraborty, Manoj Kumar Mitra and Debabrata Basu “Layered double hydroxide: Inorganic organic conjugate nanocarrier for methotrexate”, *Journal of Physics and Chemistry of Solids*, 72 [6], 779-783, (2011).
[10.1016/j.jpcs.2011.03.012](https://doi.org/10.1016/j.jpcs.2011.03.012)
10. Kundu B, Nandi S K, **Dasgupta S**, Datta S, Mukherjee P, Roy S, Singh AK, Mandal T K, Das P, Bhattacharya R, Basu D., “Macro-to-micro porous special bioactive glass and ceftriaxone-sulbactam composite drug delivery system for treatment of chronic osteomyelitis: an investigation through in vitro and in vivo animal trial”, *J Mater Sci Mater Med.*, 22[3], 705-20, (2011). doi: 10.1007/s10856-010-4221-3
11. B. Kundu, S.K. Nandi, S. Roy, N. Dandapat, C. Soundrapandian, S. Datta, P. Mukherjee, A. Misra, T.K. Manadal, **S. Dasgupta** and D. Basu, “ Systematic approach to treat chronic osteomyelitis through ceftriaxone–sulbactam impregnated porous β -tricalcium phosphate localized drug delivery system”, *Ceramic International*, 38 [2], 1533–1548,(2012).
<https://doi.org/10.1016/j.ceramint.2011.09.038>

12. Manjusha Chakraborty, **Sudip Dasgupta**, Chidambaram Soundrapandian, Jui Chakraborty, and Debabrata Basu, Swapankumar Ghosh, Manoj K. Mitra, “Methotrexate intercalated ZnAl-layered double hydroxide nanohybrid”, *Solid State Chemistry*, 184, 2439-2445, (2011). <https://doi.org/10.1016/j.jssc.2011.07.015>
13. Jui Chakraborty, Nina Daneu, Aleksander Rečnik, Manjusha Chakraborty, **Sudip Dasgupta**, Jiten Ghosh, Somoshree Sengupta, Sujata Mazumdar, Mithlesh K. Sinha, Debabrata Basu, “Stepwise formation of crystalline apatite in the biomimetic coating of surgical grade SS 316L substrate: A TEM analysis”, *Journal of the Taiwan Institute of Chemical Engineers*, 42,[4], 682-687, (2011). doi:[10.1016/j.jtice.2010.11.008](https://doi.org/10.1016/j.jtice.2010.11.008)
14. Manjusha Chakraborty, **Sudip Dasgupta**, Somoshree Sengupta, Jui Chakraborty, Swapankumar Ghosh, Manoj Mitra, Akhilesh Misra, Tapan Kumar Mandal and Debabrata Basu “Facile synthetic strategy for Mg-Al layered double hydroxide material as nanocarrier for methotrexate”, *Ceramic International*, 38 [2], , 941–949, (2012). DOI: [10.1016/j.ceramint.2011.08.014](https://doi.org/10.1016/j.ceramint.2011.08.014)
15. Jui Chakraborty, Somoshree Sengupta, **Sudip Dasgupta**, Manjusha Chakraborty, Swapankumar Ghosh, Sudipta Mallik, Kamal Lal Das, Debabrata Basu, “Determination of trace level carbonate ion in Mg–Al layered double hydroxide: Its significance on the anion exchange behavior”, *Journal of industrial and engineering chemistry*, 18 (2012), 2211-2216. <https://doi.org/10.1016/j.jiec.2012.06.020>
16. **Sudip Dasgupta**, Solaiman Tarafder, Amit Bandyopadhyay, Susmita Bose, “Effect of grain size on mechanical, surface and biological properties of microwave sintered hydroxyapatite” *Materials Science and Engineering C* 33 (2013) 2846–2854
17. Kanchan Maji, **Sudip Dasgupta**.” Hydroxyapatite-Chitosan and Gelatin Based Scaffold for Bone Tissue Engineering”, *Transaction of the Indian Ceramic Society*, 73(2), 110-114, (2014).
18. Kanchan Maji, **Sudip Dasgupta**, Biswanath Kundu, and Akalabya Bissoyi “Development of Gelatin-Chitosan-Hydroxyapatite Based Bioactive Bone Scaffold with Controlled Pore Size and Mechanical Strength”, *Journal of Biomaterials Science, Polymer Edition*, 2015, Vol. 26, No. 16, 1190-1209, DOI: [10.1080/09205063.2015.1082809](https://doi.org/10.1080/09205063.2015.1082809)
19. Kanchan Maji, **Sudip Dasgupta**, “Bioglass and biopolymer based composite scaffold for bone regeneration” , *Transaction of the Indian Ceramic Society*, DOI: [10.1080/0371750X.2015.1092396](https://doi.org/10.1080/0371750X.2015.1092396).
20. Soumini Mondal, **Sudip Dasgupta**, “MgAl- Layered Double Hydroxide Nanoparticles for Controlled Release of Salicylate”, *Materials Science and Engineering: C*, Volume 68, 1 November 2016, Pages 557-564
21. Kanchan Maji, **Sudip Dasgupta**, Krishna Pramanik, Akalabya Bishoyi, “Preparation and evaluation of novel chitosan/gelatin/nano-bioglass 3D porous scaffold for Bone Tissue

Engineering”, International Journal of Biomaterials, Volume 2016 (2016), Article ID 9825659, 14 pages, <http://dx.doi.org/10.1155/2016/9825659>

22. **Maji K and Dasgupta S**, “Effect of β -Tricalcium Phosphate Nanoparticles Additions on the Properties of Gelatin–Chitosan Scaffolds”, Maji and Dasgupta, *Bioceram Dev Appl* 2017, 7:2, DOI: [10.4172/2090-5025.1000103](https://doi.org/10.4172/2090-5025.1000103)

23. **Dasgupta S**, “Hydroxyapatite Scaffolds for Bone Tissue Engineering”, Dasgupta, *Bioceram Dev Appl* 2017, 7:2, DOI: [10.4172/2090-5025.1000e110](https://doi.org/10.4172/2090-5025.1000e110)

24. Kanchan Maji, **Sudip Dasgupta**, Krishna Pramanik, Akalabya Bissoyi, "Preparation and Characterization of Gelatin–Chitosan–nano β -TCP Based Scaffold for Orthopaedic Application , under review in *Materials Science and Engineering C*, Volume 86, 1 May 2018, Pages 83-94

25. **Sudip Dasgupta**, Kanchan Maji, Samit Nandi "Investigating the Mechanical, Physicochemical and Osteogenic Properties in Gelatin–Chitosan–Bioactive Nanoceramic Composite Scaffolds for Bone Tissue Regeneration: In Vitro and In Vivo" *Materials Science and Engineering C*, [Volume 94](https://doi.org/10.1016/j.msc.2018.10.011), 1 January 2019, Pages 713-728

26. **Sudip Dasgupta**, “Prospective of Calcium Phosphate Cements for Bone Regeneration: Physicochemical, Mechanical and Biological Properties”, *SM Journal of Orthopedics*, 2018; 4(1): 1066.

27. Kanchan Maji, **Sudip Dasgupta** , “Characterization and in vitro evaluation of gelatin–chitosan scaffold reinforced with bioceramic nanoparticles for bone tissue engineering”; *Journal of Materials Research* 34(16):1-12,2019,DOI: [10.1557/jmr.2019.170](https://doi.org/10.1557/jmr.2019.170)

28. Yogendra Pratap Singh, **Sudip Dasgupta**, Suprabha Nayar & Rakesh Bhaskar, “Optimization of electrospinning process & parameters for producing defect-free chitosan/polyethylene oxide nanofibers for bone tissue engineering” *Journal of Biomaterials Science, Polymer Edition* 31(6), pp 781-803,2020; doi.org/10.1080/09205063.2020.1718824

29. Yogendra Pratap Singh, **Sudip Dasgupta**, Rakesh Bhaskar; “Preparation, characterization and bioactivities of nano anhydrous calcium phosphate added gelatin–chitosan scaffolds for bone tissue engineering”; *Journal of Biomaterials Science Polymer Edition*;, 30(3):pp1-23, 2019, DOI: [10.1080/09205063.2019.1663474](https://doi.org/10.1080/09205063.2019.1663474)

30. Sujata Swain, Sk. Muneer A., R. Sahu, A. Mahapatra, R. R. Negi, B.Samanta, D. Nanda, P. Kumar, **S. Dasgupta** & Sonia “Structural, Mechanical and Dielectric Properties of Microwave-Assisted High-Energy Ball Milling Synthesis of Hydroxyapatite” , *Integrated Ferroelectrics*, 205:1, 186-193, (2020) , DOI: [10.1080/10584587.2019.1675014](https://doi.org/10.1080/10584587.2019.1675014)

31. Sambit Ray, **Sudip Dasgupta**,” First principle study on in-vitro antimicrobial properties of nano 52S4.6 bioactive glass” *Ceramic International*,46 (9) , pp 13886-13892, 2020, DOI: [10.1016/j.ceramint.2020.02.182](https://doi.org/10.1016/j.ceramint.2020.02.182)

32. Kanchan Maji, **Sudip Dasgupta**, Rakesh Bhaskar, Mukesh Kumar Gupta, “ Photo-crosslinked alginate nano-hydroxyapatite paste for bone tissue engineering”; *Biomedical Materials*, Pub Date :2020-05-21 , DOI: 10.1088/1748-605x/ab9551

Book Chapters.

1. Sudip Dasgupta, Amit Bandyopadhyay, Susmita Bose, “Calcium Phosphate Nanocarrier in BSA Delivery”, *Advances in Bioceramics and Porous Ceramics: Ceramic Engineering and Science Proceedings*, Volume 29, Issue 7, Pages: 43–52, 2009, Published Online: 1 APR 2009, DOI: 10.1002/9780470456262.ch5
2. Honglong Wang, Zhizhi Sheng, Emily Tarwater, Xingxing Zhang, **Sudip Dasgupta**, Jeffrey Fergus, “Degradation of $\text{Sm}_2\text{Zr}_2\text{O}_7$ thermal barrier coating caused by calcium-magnesium- aluminum-silicon oxide (cmas) deposition” *Proceedings in Energy Technology 2015: High- Temperature Systems for Energy Conversion and Storage*.

CONFERENCE PROCEEDINGS

1. Dinesh C. Agrawal, **Sudip Dasgupta**. “Use of Alkoxide Sol Gel Process for Linear Assembly of Oxide particles”, *International Congress of Nanotechnology*, San Francisco, CA, USA, 2004.
2. S. Bose, **S. Dasgupta**, W. Xue, and A. Bandyopadhyay, “Tricalcium Phosphate Nanoparticles: Osteoblast Response and A Novel Drug Carrier,” *Proceedings of the 4th International Symposium on Nano Manufacturing*, MIT Press, MIT, MA,USA, 2006. (**Outstanding Paper Award**)
3. **Sudip Dasgupta**, Amit Bandyopadhyay, Susmita Bose. “Nanoscale Calcium Phosphate for Protein Delivery”, *International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, FL, USA, 2008.
4. Kanchan Maji, **Sudip Dasgupta**. “Fabrication and Characterization of Hydroxyapatite and Biopolymer Based Composite for Bone Healing” *International Conference on Tissue Engineering and Regenerative Medicine*, NIT-Rourkela, India, 2013.
5. **Sudip Dasgupta**, Kanchan Maji “Comparative study on Mechanical Strength of Macroporous Hydroxyapatite-Biopolymer Based Composite Scaffold” *International Conference on Advances in Engineering & Technology*, Singapore, 2014.
6. **Sudip Dasgupta**, Debosmita Pani, Kanchan Maji, “E-glass fiber reinforced calcium phosphate cements”, accepted in *ICMSME 2015: 17th International Conference on Materials Science and Mechanical Engineering*. London, United Kingdom
7. **Sudip Dasgupta** “Controlled Release of Ibuprofen Using Mg Al LDH Nano carrier”, *International Conference on Materials, Alloys and Experimental Mechanics(ICMAEM)*, Hyderabad, India, 3 - 4 July, 2017
8. **Sudip Dasgupta** “ Preparation and Characterization of Alginate- Hydroxyapatite Paste for Bone Regeneration” *Proceedings of IRF International Conference*, Hyderabad, Page 1-7, 2018

ABSTRACT SUBMISSION AND PRESENTATIONS

1. **S. Dasgupta**, A. Bandyopadhyay, S. Bose, “ β -Tricalcium Phosphate Powders Synthesis for Bone Grafts”, Materials Science & Technology 07, Detroit, MI, USA, 2007.
2. **S. Dasgupta**, A. Bandyopadhyay, S. Bose. “Nanocrystalline Tricalcium Phosphate- A Novel Drug Carrier”, Materials Science & Technology 07, Detroit, MI, USA, 2007.
3. **S. Dasgupta**, A. Bandyopadhyay, S. Bose. “Hydroxyapatite Grain Size Effect on Bone Cell-Materials Interaction”, Materials Science & Technology 07, Detroit, MI, USA, 2007.
4. **Sudip Dasgupta**, Amit Bandyopadhyay and Susmita Bose, “Controlled Release of Bovine Serum Albumin Protein Using Calcium Phosphate Nanocarriers”, TMS, Pittsburgh, PA, 2009.

SPONSORED PROJECTS

1. “Injectable and Photocurable Alginate-Hydroxyapatite Paste for Bone Regeneration” [22/704/15/EMR-II]- Sponsored by CSIR
2. "Injectable Nanocrystalline Hydroxyapatite- Polyanhydride Based Paste for Bone Substitution" [BT/PR13005/MED/31/294/2015]"—Sponsored by DBT

PROFESSIONAL EXPERIENCE

Courses taught at NIT –Rourkela as Assistant Professor (2011- Present)

CR 617	ADVANCES IN BIOCERAMICS
CR417	BIOMATERIALS FOR ARTIFICIAL IMPLANTS
CR611	INDUSTRIAL FURNACE TECHNOLOGY
CR 377	CERAMIC EQUIPMENT DESIGN LABORATORY
CR 346	NANOCERAMICS
CR 446	THIN FILM & COATING
CR 415	BIOCERAMICS
CR 686	SEMINAR & TECHNICAL WRITING

Student's supervision

➤ Passed PhD students

Dr. Kanchan Maji

“Gelatin, Chitosan and Nanoactive Bioceramic Based Composite Scaffolds for Orthopedic Application”

➤ Passed M. Tech. Students

1) Ms Debasmita Pani

“Effect of Si doping and e-glass fiber addition on physicochemical and mechanical properties of calcium phosphate cement”

2) Ms Soumini Mondal

“Mg-Al Layered Double Hydroxide Nano-Carrier for Controlled Release of anti-inflammatory Drug.”

3) Mr. Amit Saha

“Effect of CMAS deposition on pyrochlore based top coat of thermal barrier coating”

4) Mr. Navneet Tiwari

“Preparation and Characterization of Zirconia- Alumina-Hydroxyapatite Composite for Bone implant ”

5) Mr. Shubham Kaushik

6) Mr. Avinash Kumar

Previous work experience

Research Associate, Central Glass & Ceramic Research Institute, Kolkata, India, July 2009- 2010)

“Synthesis and characterization of layer double hydroxide nanovectors for targeted delivery of anticancerous drug.

Post doctoral Research Associate, Mechanical Engineering and Applied Mechanics, University of Pennsylvania, PA, USA, December 08- April, 09

- Investigation on endothelial cell injury in contact with air bubble.
- Study on mechanotransduction in endothelial cell

Graduate Research Assistant, Washington State University, Pullman, WA (2005–2006, 2007- present).

- Synthesis of calcium phosphate nanoparticles with different aspect ratio using microemulsion, sol gel, hydrothermal, surfactant based template system and precipitation technique.
- Successfully processed microwave sintered nanostructured hydroxyapatite (HAp) compacts with improved mechanical properties and bioactivity.
- Study on bovine serum albumin (BSA) loading and release profile from calcium phosphate nanoparticles as a function of particles size, surface area, crystallinity, and phase composition.

- Study on the effect of Zn and Mg on BSA loading and release from *in situ* synthesized HAp-BSA nanocarriers.

Graduate Teaching Assistant, Washington State University, Pullman, WA (2006–2007).

- Awarded for a perfect teaching assistant rating

Graduate Research Assistant, Auburn University, Auburn, AL (2004–2005).

- Development of magnetostrictive material based bacterial sensor for salmonella detection using bacteriophage as probe (Auburn University detection and food safety).

Senior Research Fellow, Central Glass & Ceramic Research Institute, Kolkata, India (Jan 2004- July 2004).

- Study on densification kinetics of aluminum nitride ceramics with calcium nitrate tetrahydrate as dopant using liquid phase sintering.

Graduate Research Assistant, Indian Institute of Technology, Kanpur, India.

- Synthesis of zirconia nanoparticles from water- alcohol mixture of zirconyl salt by microwave heating.
- Studying self assembly of zirconia nanoparticles in silica film after simultaneous addition of binder and dispersant in zirconia nanoparticles and TEOS sol.

RESEARCH INTEREST

- Inorganic nanoparticle based protein and drug delivery system.
- Nanostructured biomaterials for bone and dental implant.
- Processing of nanostructured ceramics.
- Thermal/ Environmental Barrier Coating.

SKILLS

Experimental Skills: Synthesis of nanocrystalline ceramic and metal powder by wet chemical route, Phase and lattice parameter analysis using X-ray diffraction, EDAX analysis, Electron and confocal microscopy, Atomic force microscopy, Field emission scanning electron microscopy, Transmission electron microscopy, X-ray photoelectron spectroscopy, UV/VIS spectrophotometry, Dynamic light scattering technique, Zeta Potentiometer, Differential scanning calorimetry, High Pressure Liquid chromatography, Ion chromatography, Atomic absorption spectroscopy, ICP-OES, FTIR spectroscopy, BET surface area analysis, Microwave assisted sintering, Compressive/ Mechanical strength analysis, Indentation hardness and fracture toughness analysis, Osteoblast cell culture experiment, MTT assay, Immunocytochemistry, Flow Cytometry, Cell counting using cytoplasmic or nucleus staining.

Computer skills: Familiar with Windows operating systems and standard software packages (Microsoft office, Microcal Origin 7.0, Adobe photoshop).

Languages Known: Fortran 77, C, Java

REFERENCES

1. Susmita Bose
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