

## Scientist/Officers biodata

a. **Name:**

Dibyendu Chakravarty

b. **Qualification:**

M.Tech (IT-BHU); PhD in Materials Science (IISc Bangalore)

c. **Designation:**

Scientist-E

d. **Contact information**

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e. **Experience:**

15 years

f. **Research Areas of Interest:**

- Synthesis and consolidation of nanomaterials
- Processing of ceramics
- Spark plasma sintering of ceramic, metallic and composite materials
- Energy materials

g. **List of Journal Publications:**

1. Dibyendu Chakravarty, S. Roy, P.K. Das, "DC resistivity of alumina and zirconia sintered with TiC," Bulletin of Materials Science. 28[3], 227-231, 2005.

2. N.V Rama Rao, R.Gopalan, M. Manivel Raja, V.Chandrasekharan, D.Chakravarty, R.Sundaresan, R.Ranganathan, K.Hono, "Structural and magnetic studies on spark plasma sintered SmCo<sub>5</sub>/Fe bulk nanocomposite magnets," Journal of Magnetism and Magnetic Materials. 312, 252-257, 2007.

3. Dibyendu Chakravarty, Prakash Singh, Sindhu Singh, Devendra Kumar, Om Parkash, "Electrical conduction behavior of high dielectric constant perovskite oxide La<sub>x</sub>Ca<sub>1-3x/2</sub>Cu<sub>3</sub>Ti<sub>4</sub>O<sub>12</sub>," Journal of Alloys and Compounds. 438, 253-257, 2007.

4. D.Roy, D.Chakravarty, R.Mitra, I.Manna, "Effect of sintering on microstructure and mechanical properties of nano-TiO<sub>2</sub> dispersed Al<sub>65</sub>Cu<sub>20</sub>Ti<sub>15</sub> amorphous/nanocrystalline matrix composite," Journal of Alloys and Compounds. 460,320-325, 2008.

5. Dibyendu Chakravarty, S. Bysakh, K.Muraleedharan, Tata N Rao, R. Sundaresan, "Spark Plasma Sintering of Magnesia-Doped Alumina with High Hardness and Fracture Toughness," Journal of the American Ceramic Society. 91[1], 203-208, 2008

6. Dibyendu Chakravarty, H.Ramesh, Tata N.Rao, "High strength porous alumina by spark plasma sintering," *Journal of the European Ceramic Society*. 29, 1361-1369, 2009.
7. R.Mazumder, D.Chakravarty, D.Bhattyacharya, A.Sen, "Spark plasma sintering of BiFeO<sub>3</sub>," *Materials Research Bulletin*. 44, 555-559, 2009.
8. Dibyendu Chakravarty, G. Sundararajan, "Effect of Applied Stress on IR transmission of Spark Plasma-Sintered Alumina," *Journal of the American Ceramic Society*. 93[4],951-953, 2010.
9. A.Mukhopadhyay, Dibyendu Chakravarty, B.Basu, "Spark Plasma Sintered WC-ZrO<sub>2</sub>-Co Multi Phase Nanocomposites with High Fracture Toughness and Strength," *Journal of the American Ceramic Society*. 93[6], 1754-1763, 2010
10. K.Rajeswari, U.S.Hareesh, Dibyendu Chakravarty, R.Subasri, Roy Johnson, "Comparative evaluation of SPS, MW and TTS on the density and microstructure evaluation of stabilized ZrO<sub>2</sub> ceramics," *Science of Sintering*. 42, 259-67, 2010
11. Amit S Sharma, K.Biswas, B.Basu, Dibyendu Chakravarty, "Spark Plasma Sintering of nanocrystalline Cu and Cu-10 wt % Pb," *Metallurgical and Materials Transactions A*. 42[7], 2072-84, 2011
12. Dibyendu Chakravarty, B. V. Sarada, S.B. Chandrasekhar, K.Saravanan, T.N.Rao, "A novel method of fabricating porous silicon," *Materials Science and Engineering A*. 528 (25-26), 7831-34, 2011.
13. Dibyendu Chakravarty, Hina Gokhale, G. Sundararajan, "Optimizing mechanical properties of spark plasma sintered ZTA using neural network and genetic algorithm," *Materials Science and Engineering A*. 529, 492-96, 2011.
14. B.Suresh, K.Rajeswari, Dibyendu Chakravarty, D.Das, R.Johnson, "Effect of nano grain size on the ionic conductivity of spark plasma sintered 8YSZ electrolyte," *International Journal of Hydrogen Energy*. 37 (1), 511-517, 2012
- 15.S.Shalini, P.Sandhyarani, Y.S.Rao, D.Chakravarty, R. Subasri, "Wet chemical synthesis and characterization of Na<sup>+</sup> conducting sodium dysprosium silicates," *Ceramics International*. 38 (1), 295-300, 2012.
16. M.J.Anjali, P.Biswas, D. Chakravarty, U.S.Hareesh, Y.S.Rao, R.Johnson, "Low temperature in-situ reaction sintering of zircon-alumina composites through SPS," *Science of Sintering*. 44, 323-330, 2012
17. Dibyendu Chakravarty, G. Sundararajan, "Microstructure, mechanical properties and machining performance of spark plasma sintered Al<sub>2</sub>O<sub>3</sub>-ZrO<sub>2</sub>-TiCN nanocomposites," *Journal of the European Ceramic Society*. 33, 2597-2607, 2013.

18. R.Papitha, M. Buchi Suresh, D. Chakravarty, A Swarnakar, D.Das, R. Johnson, "Eutectoid decomposition of aluminum titanate ( $\text{Al}_2\text{TiO}_5$ ) ceramics under spark plasma sintering (SPS) and conventional (CRH) thermal treatments," *Ceramics International*, 40, 659-66, 2014.
19. Dibyendu Chakravarty, Atul Chokshi, "Direct Characterizing of Densification Mechanisms during Spark Plasma Sintering," *Journal of the American Ceramic Society*, 97[3], 765-71, 2014.
20. S. Varam, PVSL Narayana, MD Prasad, D. Chakravarty, K.V. Rajulapati, Bhanu Sankara Rao, "Strain rate sensitivity of bulk multiphase nanocrystalline Al-W-based alloy," *Phil. Mag. Letter*, 94[9], 582-91, 2014.
21. P.Saravanan, V.T.P Vinod, M.Cernek, D. Chakravarty, P.Ghoshal, S.V.Kamat, "Exchange coupled rare earth free Mn-Al/Fe nanocomposite magnets by SPS," *Materials Letters*, 137, 369-72, 2014.
22. P.Saravanan, V.T.P Vinod, M.Cernek, A. Selvapriya, D. Chakravarty, S.V.Kamat, "Processing of Mn-Al nanostructured magnets by SPS and subsequent rapid thermal annealing," *Journal of Magnetism and Magnetic Materials*, 374, 427-32, 2015.
23. Dibyendu Chakravarty, Atul Chokshi, "Influence of Yttria and Zirconia Additions on Spark Plasma Sintering of Alumina Composites," *Journal of Materials Research*, 30[8], 1148-56, 2015.
24. Dibyendu Chakravarty, C.S.Tiwary, L.D.Machado, G.Brunetto, S.Vinod, R.M.Yadav, D.S.Galvao, S.V.Joshi, G.Sundararajan, P.M.Ajayan, "Zirconia nanoparticle reinforced, morphology engineered graphene based foam," *Advanced Materials*, 27, 4534-43, 2015.
25. Mohan Nuthalapati, S.K.Karak, Dibyendu Chakravarty, A. Basu, "Development of nano-Y<sub>2</sub>O<sub>3</sub> dispersed Zr alloys by mechanical alloying and spark plasma sintering," *Mater Sc and Engg. A*, 650, 145-153, 2016
26. P. Barick, Dibyendu Chakravarty, B.P. Saha, R. Mitra, S.V.Joshi, "Effect of pressure and temperature on densification, microstructure and mechanical properties of spark plasma sintered silicon carbide processed with  $\beta$ -silicon carbide nanopowder and sintering additives," *Ceramics International*, 42[3], 3836-48, 2016
27. P.Sahani, S.K.Karak, B.Mishra, Dibyendu Chakravarty, D. Chaira, "Effect of Al addition on SiC-B<sub>4</sub>C cermet prepared by pressureless sintering and spark plasma sintering methods," *Inter Journal of Refract Met and Hard Mater*, 57, 31-41, 2016
28. Rishu Kumar, Kushal Singh, Dibyendu Chakravarty, Anirban Chowdhury, "Attaining neat-theoretical densification in nanograined pyrochlore La<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub> (LZ) ceramic at 1150°C by spark plasma sintering," *Scripta Materialia*, 117, 37-40, 2016

29. P.Sahani, S.K.Karak, B.Mishra, Dibyendu Chakravarty, D. Chaira, "A comparative study on SiC-B4C-Si cermet prepared by pressureless sintering and spark plasma sintering methods," *Metallurgical and Materials Transactions A*, 47[6], 3065-76, 2016
30. Dibyendu Chakravarty, C.S.Tiwary, C.Woellner, S.Radhakrishnan, S. Vinod, P.A.S. Autreto, S.Bhowmick, S. Asif, S.A Mani, D. S. Galvao, P.M.Ajayan, "3D Porous Graphene by Low-Temperature Plasma Welding for Bone Implants," *Advanced Materials*, 28[40], 8959-67, 2016
31. P.Biswas, Dibyendu Chakravarty, M.B.Suresh, R.Johnson, M.Krishna Mohan, "Fabrication of graphite contamination free polycrystalline transparent MgAl<sub>2</sub>O<sub>4</sub> spinel by SPS using platinum foil," *Ceram. Int.* 42[15], 17920-23, 2016.
32. Mohan Nuthalapati, S.K.Karak, J. Dutta Majumdar, Dibyendu Chakravarty, A. Basu, "Corrosion behavior and high temperature oxidation kinetics of nano-TiO<sub>2</sub>/Y<sub>2</sub>O<sub>3</sub> dispersed zirconium alloy," *J. Alloys Comp.* 689, 908-17, 2016
33. Mohan Nuthalapati, S. K. Karak, D. Chakravarty, A. Basu, "Comparative Study on Microscopic, Physical and Mechanical Properties of Conventional and Spark Plasma Sintered Nano-TiO<sub>2</sub>-Dispersed Zirconium-Based Alloys," *Metallogr. Microstruct. Anal.*, 6, 527-540, 2017
34. P. Sai Karthik, S.B. Chandrasekhar, D. Chakravarty, P.V.V. Srinivas, V.S.K. Chakravadhanula, T.N. Rao, "Propellant grade ultrafine aluminum powder by RF induction plasma," *Adv. Powder Technol.*, 29, 804-812, 2018
35. C. Gautam, Dibyendu Chakravarty, A. Gautam, C.S.Tiwary, C.F.Woellner, V.K.Mishra, N.Ahmad, S.Ozden, S.Jose, S.Birader, R.Vajtai, R.Trivedi, D.S Galvao, P.M Ajayan, "Synthesis and 3D interconnected nanostructures h-BN-Based biocomposites by low-temperature plasma sintering: bone regeneration applications," *ACS Omega*, 3, 6013-6021, 2018
36. A.K.Mallik, M. Das, S. Das, D. Chakravarty, "Spark plasma sintering of Ti-diamond composites," *Ceram. Int.*, 45, 11281-86, 2019

#### **h. List of Patents:**

1. Novel ceramic materials having improved mechanical properties, a process for its preparation and a process for making cutting tools of such materials, IN200503396-11
2. An improved method of preparing porous silicon compacts, patent number 304349, granted on 12-12-2018
3. Method of fabricating tungsten based composite sheets by spark plasma sintering techniques for making components, application no 201911014933 date 13-4-2019

i. **Affiliation to Professional societies:**

- Member of the American Ceramic Society
- Life member of Indian Institute of Metals (IIM)
- Life member of Materials Research Society of India (MRSI)
- Life member of Powder Metallurgy Association of India (PMAI)

j. **Awards & Honors:**

- Master of Technology Gold medal, Banaras Hindu University, 2003
- Selected for the Indo-US Science and Technology Research Fellow for the year 2014.

k. **Invited lectures:**

1. PMSC-12 at MGIT on December 22, 2012 entitled “SPS of ceramic and metallic systems for structural and functional applications”
2. CEP-50 at DMRL, Hyderabad on July 9, 2013 entitled “SPS: An emerging technique for developing structural and functional components”

l. **Photograph**

