Vita

Name: Dr. Siddhartha Kumar Pradhan

I. Personal profile

Address:	Advanced Materials Technology Dept. Institute of Minerals and Materials Technology (CSIR-IMMT) Bhubaneswar, 751013 (Odisha), India
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Birth Date:	16 June 1973
Birth Place:	Jharsuguda, Odisha, India

II. Current position

Sr. Scientist, Advanced Materials Technology Dept., CSIR-IMMT Bhubaneswar

I have been involved in the CVD and PVD based research activities. The aim is to develop world class research facilities and deliver new plasma and coating processing technologies.

III. Education

- Ph.D. in Materials Science and Engineering, University of Kentucky, USA - 2003
- M.E. in Metallurgy, Indian Institute of Science, Bangalore, India - 998
- B.E. in Metallurgical Engineering, NIT (REC), Rourkela, India – 1995

IV. Research interests

Thin films; hard and optical coatings; plasma processing; films and nanomaterials of diamond/DLC, TiO_2, CrN etc.; chemical/physical vapor deposition; design of vapor deposition reactors/systems; material characterization (by Raman, AFM, nanoindentation, contact angle, ellipsometry etc.)

V. Current and completed research projects

As principal investigator:

- Development of 3D diamond like carbon (DLC) coating for wear resistant parts in an indigenously developed plasma reactor, CSIR-IMMT, 2016-17.
- Processing of natural gemstones, 12th Five Year Plan project, CSIR, 2012-17

- Centre for special materials, 12th Five Year Plan project, CSIR, 2012-17.
- Transition from amorphous to hard carbon (DLC) to diamond growth, CSIR-BMBF (Indo-German, with University of Duisburg-Essen, Duisburg), 2011-2013.
- Making and characterization of pure-diamond based windows for optical and radiation applications, BRNS, 2011-2014.
- TiO_2-SiO_2 based transparent nanostructured hard coatings by sputtering, CSIR (empower) 2010-2012.
- Growth of thick DLC-DLC:N multilayer wear-resistant coating by plasma activated chemical vapor deposition, DST (SERC) 2009-2011.
- Growth of switchable superhydrophilic-superhydrophobic TiO_2 thin films by sputtering DST (FastTrack) 2008-2011.

As co-investigator:

- Smelting reduction of iron ores/fines by hydrogen plasma, Ministry of Steel, New Delhi.
- CSIR Innovation Centre for Plasma Processing (ICPP), IMMT Bhubaneswar.
- Deposition of wear-resistant coatings by chemical vapor deposition, EGIDE postdoctoral research, LaBoMaP, ENSAM Cluny, France.
- Development of MOCVD protective coatings for cutting tools, CRMS Research, University of Kentucky, USA.

VI. Peer reviewed publications

1. U. Balaji, S.K. Pradhan, Titanium anodisation designed for surface colourization-Systemization of parametric interaction using response surface methodology, **Materials and Design 139 (2018) 409-418**.
2. S. Kumari, A. Panigrahi, S. K. Singh, S. K. Pradhan, Enhanced corrosion resistance and mechanical properties of nanostructured graphene-polymer composite coating on copper by electrophoretic deposition**, J. Coating Technology and Research (2017).**
3. B. Pani, S. Swain, S.K. Pradhan, U.P. Singh, Enhancement of structural & opt- electronic properties of vacuum processed Cu2ZnSn4 thin films by thiourea treatment, **J. Alloys Comp. 708 (2017) 181-186**.
4. M. Chakravarty, R. Sharma, K. Amit, N. Sharma, S.K. Pradhan, Synthesis and Bio-compatibility study of thermal-CVD grown graphene, **Int. J. Nanosci. 15 (2016) 1660016 (8pages)**.
5. S. Swain, S.K. Pradhan, M. Jeevitha, P. Acharya, M. Debata, T. Dash, B.B. Nayak, B.K. Mishra, Microwave heat treatment of natural ruby and its characterization, **Appl. Phys. A (2016) 122-224**.
6. S.K. Pradhan, M. Jeevitha, S.K. Singh, Plasma cleaning of old Indian coin in H_2-Ar atmosphere, **Appl. Surf. Sci. 357 (2015) 445-451**.
7. S. Bajpai, A. Gupta, S.K. Pradhan, T. Mandal, K. Balani, Crack propagation resistance of α-Al2O3 reinforced pulsed laser-deposited hydroxyapatite coating on 316 stainless steel, ***JOM 66 (10) (2014) 2095-2107***.
8. S. Sahoo, S.K. Pradhan, M. Jeevitha, S. Bagchi, P.K. Barhai, A study of diamond like carbon/chromium films deposited bymicrowave plasma activated chemical vapor deposition, ***J. Non-Cryst. Sol. 386 (2014) 14-18***.

9. S. Sarkar, S.K. Pradhan, Tailoring of optical and wetting properties of sputter deposited silica thin films by glancing angle deposition, ***Appl. Surf. Sci. 290 (2014) 509-513***.
10. S.K. Pradhan, S. Sahoo, P.K. Barhai, Diamond like rod-shaped carbon nanostructures grown by microwave plasma CVD, ***AIP Conf. Proc. 1451 (2012) 133-135.***
11. S. K. Pradhan, M. Jeevitha, S. Bajpai, Mechanical properties of single and multilayer CrN films synthesized by pulsed DC sputtering, ***AIP Conf. Proc. 1451(2012) 263-265***.
12. S. Sahoo, S.K. Pradhan, S.S. Pradhan, V. Bhavanasi, S. Sarangi, P.K. Barahi, Influence of bowl shaped substrate holder on the growth of polymeric DLC film in a microwave plasma CVD reactor, ***Bull. Mater. Sci 35(2012) 1117-1121***.
13. S.K. Pradhan, B. Satpati, B.P. Bag, T. Sharda, Structural and optical characterization of thick and thin polycrystalline diamond films deposited by microwave plasma activated CVD, ***Bull. Mater. Sci. 35 (2012) 1-5***.
14. A.K. Mishra, R. Narayan, T. M. Aminabhavi, S.K. Pradhan, K.V.S.N. Raju, Hyperbranched polyurethane-urea-imide/o-clay-silica hybrids: Synthesis and characterization, ***J. Appl. Poly. Sci. 125 (2012) E67-75***.
15. K. Mohit, S.K. Rout, S. Parid, G.P. Singh, S.K. Sharma, S.K. Pradhan, Ill Wom Kim, Structural, optical and dielectric studies of $Ni_xZn_{1-x}Fe_2O_4$ prepared by auto combustion route, ***Physica B 407 (2012) 935-942***.
16. S. S. Pradhan, S.K. Pradhan, V. Bhavanasi, Sambita Sahoo, S.N. Sarangi, S. Anwar, P.K. Barhai, Low temperature stabilized rutile phase TiO_2 films grown by sputtering, ***Thin Solid Films 520 (2012) 1809-1813***.
17. D. Behera, D.K. Mishra, S.K. Pradhan, R. Sakthivel, S. Mohanty, Improvement in micro-structural and mechanical properties of zinc film by surface treatment with low temperature argon plasma, ***Appl. Surf. Sci. 258 (2011) 1103-1108***.
18. S.S. Pradhan, S.K. Pradhan, S. Bagchi, P.K. Barhai, Root growth of TiO_2 nanorods by sputtering, ***J. Cryst. Growth 300 (2011) 1-4***.
19. S.S. Pradhan; S. Sahoo; S.K. Pradhan, Influence of annealing temperature on structural, mechanical and wetting property of TiO_2 films deposited by RF magnetron sputtering, ***Thin Solid Films 518 (2010) 6904-6908.***
20. S. Sahoo, S.S. Pradhan, V. Bhavanasi, S.K. Pradhan, Structural and mechanical characterization of diamond like carbon films grown by microwave plasma CVD, ***Surf. Coat. Technol 204 (2010) 2817-2821.***
21. B. Das, B.K. Mishra, S. Angadi, S.K. Pradhan, S. Prakash, J.K. Mohanty, Characterization and recovery of copper values from discarded slag, ***Waste Management and Research 28 (2010) 561-567.***
22. S.K. Pradhan, B.B. Nayak, S.S. Sahay, B.K. Mishra, Mechanical properties of graphite flakes and spherulites measured by nanoindentation, ***Carbon 47 (2009) 2290-2292***.
23. A.K. Chaubey, S. Mohapatra, K. Jayashanker, S.K. Pradhan, B. Satpati, S.S. Sahay, B.K. Mishra and P.S. Mukherjee, Effect of Cerium Addition on Microstructure and mechanical properties of Al-Zn-Mg-Cu alloy, ***Trans. IIM. 62 (2009) 539-543***.
24. N. Pradhan, S.K. Pradhan, B.B. Nayak, P.S. Mukherjee, L.B. Sukla, B.K. Mishra, Micro-Raman analysis and AFM imaging of Acidithiobacillus ferrooxidans biofilm grown on uranium ore, ***Research in Microbiology 159 (2008) 557-561***.
25. S.K. Pradhan, B.B. Nayak, B.K. Mohapatra, B.K. Mishra, Micro Raman Spectroscopy and Electron Probe Micro Analysis of Graphite Spherulites and Flakes in Cast Iron, ***Metall. Mater. Trans. A 38 (2007) 2362-2370***.

26. S.K. Pradhan, C. Nouveau, A. Vasin, M.-A. Djouadi, Deposition of CrN coatings by PVD methods for mechanical application, ***Surf. Coat. Technol. 200 (2005) 141-145***.
27. S.K. Pradhan, P.J. Reucroft, Y. Ko, Crystallinity of Al_2O_3 films deposited by metalorganic chemical vapor deposition, ***Surf. Coat. Technol. 176 (2004) 382-384***.
28. S.K. Pradhan, E.S. Dwarakadasa, P.J. Reucroft, Processing and characterization of coconut shell powder filled UHMWPE, ***Mater. Sci. Eng. A 367 (2004) 57-62***.
29. S.K. Pradhan, P.J. Reucroft, Alan Dozier, Growth of graphitic nano- and micro- fibers, tubes and balloon-like structures from saw dust, ***Carbon 41 (2003) 2873-2884***.
30. S.K. Pradhan, P.J. Reucroft, F. Yang, A. Dozier, Growth of TiO_2 nanorods by metalorganic chemical vapor deposition, ***J. Cryst. Growth 256 (2003) 83-88***.
31. S.K. Pradhan, P.J. Reucroft, A study of growth and morphological features of TiO_xN_y thin films prepared by MOCVD, ***J. Cryst. Growth 250 (2003) 588-594***.
32. S.K. Pradhan, P.J. Reucroft, Influence of flow rate and deposition temperature on TiO_xN_y film growth and morphology, in ***"****Surface Engineering in Materials Science-II", S. Seal, N.B. Dahotre, J. Moore, A. Agarwal, S. Suryanarayana, eds.,* ***TMS Publications, Warrendale, PA, 2003, pp. 57-64.***

VII. Patents

- B.Bhoi, B.K. Mishra, R.K. Paramguru, S.K. Pradhan, P.S. Mukherjee, Priyanka Rajput, Sambita Sahoo, Snigdha Priyadarshini, S.K. Das, Green process for the preparation of direct reduced iron. ***US patent (US8728195)***.