

Name Dr P Karuna Purnapu Rupa

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Academic Qualifications PhD (Engg.), Jadavpur University.  
M.E (Mat.Sci), NIT-Trichy.  
M.Phil (Phy.), University of Hyderabad.  
M.Sc (Phy.), Osmania University.

Present Designation/Position Associate Professor, Department of Material  
Science and Engineering, Tripura University

Courses Taught Electronic and Opto-Electronic Materials  
Advanced Composite Materials  
Materials Processing Technology  
Computational Material Science  
Surface Engineering

### **Professional Experience**

|   |                         |                                                                                      |                          |
|---|-------------------------|--------------------------------------------------------------------------------------|--------------------------|
| 1 | Associate Professor     | Tripura University                                                                   | Dec. 2017 to Till date   |
| 2 | Sr. Assistant Professor | MVGR College of Engineering,<br>Vizianagaram                                         | April 2017 to Nov. 2017  |
| 3 | Sr. Scientist           | Non-Ferrous Materials Technology<br>Development Center,<br>Kanchanbagh,<br>Hyderabad | Oct. 2007 to March 2017  |
| 4 | Scientist Fellow        | CSIR-National Metallurgical Laboratory,<br>Jamshedpur                                | Sept. 2004 to Sept. 2007 |

### **Research Interests**

- 1 Hydrogen Storage Materials
- 2 Surface Engineering – Nanocomposite coatings, Thin films, Plasma Spray
4. Ultra-High Temperature Ceramics
5. Energy Materials
6. Direct Ink Writing

### Projects (PI & Co-PI)

| S.No. | Title of Project                                                                                                                                                                                    | Duration                  | Total Cost     | Funding Agency                                |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------|-----------------------------------------------|
| 1.    | Development of Thermally Responsive Cellulose Based Ceramic Ink for Direct Ink Writing<br>(PI)                                                                                                      | March 2022-<br>March 2025 | 39.00<br>Lakhs | Science and Engineering Research Board (SERB) |
| 2.    | Novel synthesis routes for high purity Kesterite (CZTS/Se) and development of cost-effective solar PV cells and modules<br><br>(As PI Upto March 2017)<br>(Subsequently, project executed by NFTDC) | July 2015 -<br>July 2018  | 81.30<br>Lakhs | Ministry of Mines                             |
| 3.    | Synthesis of Magnesium based alloys with lower sorption temperatures<br><br>(As Co-PI, PI-Director NFTDC)                                                                                           | July 2010-<br>March 2014  | 82.66<br>Lakhs | Ministry of New and Renewable Energy          |

### Projects (As Team Member)

4. Performance Optimization of IT-SOFC's by Inkjet Collaborative Project between NFTDC Printing on Porous Metal Substrates (Jet-Cell) and University of Cambridge, Funded by DST&RC-UK

(As Team member, PI-Director NFTDC)

5. Development of Free Filament and Thin Film Strain Gauge (NiCr,PdCr) Sensor and Thin Film Temperature Sensor (Pt-PtRh) for Aerospace Applications, Funded by AR&DB, Ministry of Defence,

(As Team member, PI-Director NFTDC)

6. Sorption (Hydrogen sorption-based cooling system), Project Funded by Thermax Limited,

(As Team member, PI-Director NFTDC)

## Publications

1. Structure and indentation behavior of nanocomposite Ti–B–N films, PKP Rupa, PC Chakraborti, SK Mishra, *Thin Solid Films* 564, 160-169 (2014)
2. Effect of high-temperature severe plastic deformation on microstructure and mechanical properties of IF steel, V Jindal, PKP Rupa, GK Mandal, VC Srivastava, *Journal of materials engineering and performance* 23 (6), 1954-1958 (2014)
3. XPS studies on nanocomposite Si–C–N coatings deposited by magnetron sputtering, SK Mishra, AS Bhattacharyya, PKP Rupa, LC Pathak, *Nanoscience and Nanotechnology Letters* 4 (3), 352-357 (2012)
4. Microstructure and phase composition of composite coatings formed by plasma spraying of ZrO<sub>2</sub> and B<sub>4</sub>C powders, P Karuna Purnapu Rupa, P Sharma, RM Mohanty, K Balasubramanian *Journal of thermal spray technology* 19 (4), 816-823 (2010)
5. Mechanical and deformation behaviour of titanium diboride thin films deposited by magnetron sputtering, PKP Rupa, PC Chakraborti, SK Mishra, *Thin Solid Films* 517 (9), 2912-2919 (2009)
6. Surface and nanoindentation studies on nanocrystalline titanium diboride thin film deposited by magnetron sputtering, SK Mishra, PKP Rupa, LC Pathak, *Thin Solid Films* 515 (17), 6884-6889 (2007)
7. Effect of pressure and substrate temperature on the deposition of nano-structured silicon–carbon–nitride superhard coatings by magnetron sputtering, SK Mishra, C Shekhar, PKP Rupa, LC Pathak, *Thin Solid Films* 515 (11), 4738-4744 (2007)
8. Effect of titanium diluent on the fabrication of Al<sub>2</sub>O<sub>3</sub>–ZrB<sub>2</sub> composite by SHS dynamic compaction, SK Mishra, PKP Rupa, SK Das, V Shcherbakov, *Composites science and technology* 67 (7-8), 1734-1739 (2007)
9. Fatigue damage of a thermal barrier coated Ni-base superalloy, B Goswami, BR Kumar, S Tarafder, G Krishna, PKP Rupa, SB Kumar, *High Temperature Materials and Processes* 26 (3), 209-220 (2007)
10. Characterization of bond coat in a thermal barrier coated superalloy used in combustor liners of aero engines, AK Ray, B Goswami, MP Singh, DK Das, N Roy, B Dash, BR Kumar, ..., *Materials Characterization* 57 (3), 199-209 (2006)
11. Deposition of nanostructured Si–C–N superhard coatings by rf magnetron sputtering SK Mishra, H Gaur, PKP Rupa, LC Pathak, *Journal of Vacuum Science & Technology B: Microelectronics and Nanomaterials* 13 (2006)

12. Nucleation and growth of DC magnetron sputtered titanium diboride thin films, SK Mishra, PKP Rupa, LC Pathak, Surface and Coatings Technology 200 (12-13), 4078-4081 (2006)

13. Effect of alumina diluent on the fabrication of in-situ Al<sub>2</sub>O<sub>3</sub>-Ti/ZrB<sub>2</sub> composite by self-propagating high temperature synthesis dynamic compaction, SK Mishra, PKP Rupa, SK Das, V Shcherbakov, Metallurgical and materials transactions B 37 (4), 641-647 (2006)

### **International Conference Proceedings**

14. Development of Intermediate Temperature (550-650oC) Metal Supported Solid Oxide Fuel Cells (SOFCs) Using Plasma Processes, PKP Rupa, VR Goli, K Balasubramanian, RI Tomov, RV Kumar, ECS Transactions 68 (1), 2245 (2015)

15. Novel Co-Sintering Techniques for Fabricating Intermediate Temperature, Metal Supported Solid Oxide Fuel Cells (IT-m-SOFCs), SH Rahul, PKP Rupa, N Panda, K Balasubramanian, RV Kumar, ECS Transactions 57 (1), 857 (2013)

16. Nanoindentation Studies Of Hard Nanocomposite Ti-B-N Thin Films, PKP Rupa, PC Chakraborty, SK Mishra, AIP Conference Proceedings 1393 (1), 239-240 (2011)

17. Indentation Response and Contact Damage of Hard TBN Films Deposited by Magnetron Sputtering, PKP Rupa, PC Chakraborti, SK Mishra, Eurasian Chemico-Technological Journal 13 (1-2), 81-84 (2011)

### **Invited Talks**

1. "Advanced Coatings for Aerospace Applications", One-Day National Seminar on "Development of Materials for Aerospace Applications" at Crescent College of Science and Technology, October 2018

2. "Solid State Hydrogen Storage Materials" at UGC – Human Resource Development Centre, University of Hyderabad, January 2019

3. "Hard Coatings" at UGC – Human Resource Development Centre, University of Hyderabad, January 2019

4. "Advances in Thermal Spray Coatings" at STTP on Recent Advances in Materials Science and Engineering NIT-Agartala, August 2019

5. "Hydrogen Storage Materials: Prospects and Applications" at STTP on Recent Advances in Materials Science and Engineering NIT-Agartala. August 2019

6. “Hydrogen as renewable energy” On the occasion of National Science Day, BJR Govt Degree College, March 2021

### **Courses Attended**

1. “Materials Science in Tribology” Under the Continuous Education Programme (CEP) of DRDO held at Defence Metallurgical Research Laboratory (DMRL), Kanchanbagh, Hyderabad, From 7<sup>th</sup> Feb. to 11<sup>th</sup> Feb. 2011
2. “Instructional Design and Delivery System” Conducted by National Institute of Technical Teachers Training & Research, held at MVGR College of Engineering, Vizianagaram, From 5<sup>th</sup> June to 10<sup>th</sup> June 2017.
3. Online Training Programme on the theme “Teaching Effectively” organized by CALEM, at the UGC HRDC, Aligarh Muslim University, from 16 February 2021 to 22 February 2021

**M.Tech. Thesis Supervised - 10**

**Ph.D. Supervised – 02 (Ongoing)**

### **Awards and Recognitions**

Recognized by MHRD as “Exceptional Mentor” for mentoring Student Team of Dept. of Materials Science and Engineering – HyStore, for making it to the finals of SMART INDIA HACKATHON -SIH (Hardware Edition) 2019.

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