

BIO-DATA

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 Surface Engineering Nanomaterials Advanced Engineering Materials

Professional Experience

Associate Professor	Tripura University	Dec. 2017 to Till date
Sr. Assistant Professor	MVGR College of Engineering, Vizianagaram	April 2017 to Nov. 2017
Sr. Scientist (Projects)	Non-Ferrous Materials Technology Development Center, Kanchanbagh, Hyderabad	April 2012 to March 2017
Engineer (Projects)	Non-Ferrous Materials Technology Development Center, Kanchanbagh, Hyderabad	Oct. 2007 to April 2012
Scientist Fellow	CSIR-National Metallurgical Laboratory, Jamshedpur	Sept. 2004 to Sept. 2007

Research Interests

- Additive Manufacturing / Direct Ink Writing
- Processing of Ceramics

Research experience in the following areas

- Surface Engineering: Plasma Spray and Thin films
- Solid State Hydrogen Storage Materials
- Thin Film Solar Cells
- IT-SOFC

Projects (as PI at TU)

- Development of Thermally Responsive Cellulose Based Ceramic Precursor Materials For Direct Ink Writing – Funded by ANRF, 39.9 Lakhs

Worked in the following Projects at NFTDC

- Novel synthesis routes for high purity Kesterite (CZTS/Se) and development of cost-effective solar PV cells and modules
- Synthesis of Magnesium based alloys with lower sorption temperatures
- Performance Optimization of IT-SOFC's by Inkjet Printing on Porous Metal Substrates (Jet-Cell): A Collaborative Project between NFTDC and University of Cambridge, Funded by DST & RC-UK
- 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
- Sorption (Hydrogen sorption-based cooling system), Project Funded by Thermax Limited

Publications

□ **Influence of rice husk addition on the rheology and printability of alumina inks for direct ink writing**

Authors: D. Majumder, P. Pal, R. Mishra, P.K.P. Rupa

Journal: Adv. Appl. Ceram. (2026)

DOI: <https://doi.org/10.1177/17436753261456636>

□ **Assessment of the Surface Texture of the Prototype Produced by DIW-3D-Printing Process Using Methyl Cellulose-Based Aluminum Ink**

Authors: A. Sarkar, P.K.P. Rupa, S. Das

Journal: J. Adv. Manuf. Syst. (2026)

DOI: <https://doi.org/10.1142/S0219686726500010>

□ **Effect of Solid Loading of TiO₂ on The Rheological Behaviour and Microstructure of Methyl Cellulose-TiO₂ Inks by Direct Ink Writing**

Authors: P. Pal, D. Majumder, P.K.P. Rupa

Journal: Trans. Indian Inst. Met. (2024)

DOI: <https://doi.org/10.1007/s12666-024-03517-3>

□ **Microstructural Characterization of Porous Alumina Prepared by Direct Ink Writing Using Rice Husk as Pore Forming Agent**

Authors: D. Majumder, P.K.P. Rupa

Journal: NanoWorld J. (2023)

DOI: <https://doi.org/10.17756/nwj.2023-s1-114>

□ **Effect of Pluronic F-127 debinding temperature on the sintering and densification of alumina by direct ink writing**

Authors: D. Majumder, P. Karuna Purnapu Rupa

Journal: Int. J. Appl. Ceram. Technol. (2023)

DOI: <https://doi.org/10.1111/ijac.14285>

□ **Structure and indentation behavior of nanocomposite Ti-B-N films**

Authors: P.K.P. Rupa, P.C. Chakraborti, S.K. Mishra

Journal: Thin Solid Films (2014)

DOI: <https://doi.org/10.1016/j.tsf.2014.05.056>

□ **Effect of high-temperature severe plastic deformation on microstructure and mechanical properties of IF steel**

Authors: V. Jindal, P.K.P. Rupa, G.K. Mandal, V.C. Srivastava

Journal: J. Mater. Eng. Perform. (2014)

DOI: <https://doi.org/10.1007/s11665-014-0975-4>

□ **XPS studies on nanocomposite Si-C-N coatings deposited by magnetron sputtering**

Authors: S.K. Mishra, A.S. Bhattacharyya, P.K.P. Rupa, L.C. Pathak

Journal: Nanosci. Nanotechnol. Lett. (2012)

DOI: <https://doi.org/10.1166/nnl.2012.1313>

□ **Microstructure and phase composition of composite coatings formed by plasma spraying of ZrO₂ and B₄C powders**

Authors: P. Karuna Purnapu Rupa, P. Sharma, R.M. Mohanty, K. Balasubramanian

Journal: J. Therm. Spray Technol. (2010)

DOI: <https://doi.org/10.1007/s11666-010-9477-9>

□ **Mechanical and deformation behaviour of titanium diboride thin films deposited by magnetron sputtering**

Authors: P.K.P. Rupa, P.C. Chakraborti, S.K. Mishra

Journal: Thin Solid Films (2009)

DOI: <https://doi.org/10.1016/j.tsf.2008.11.111>

□ **Surface and nanoindentation studies on nanocrystalline titanium diboride thin film deposited by magnetron sputtering**

Authors: S.K. Mishra, P.K.P. Rupa, L.C. Pathak

Journal: Thin Solid Films (2007)

DOI: <https://doi.org/10.1016/j.tsf.2007.02.016>

□ **Effect of pressure and substrate temperature on the deposition of nano-structured silicon–carbon–nitride superhard coatings by magnetron sputtering**

Authors: S.K. Mishra, C. Shekhar, P.K.P. Rupa

Journal: Thin Solid Films (2007)

DOI: <https://doi.org/10.1016/j.tsf.2006.11.167>

□ **Effect of titanium diluent on the fabrication of Al₂O₃–ZrB₂ composite by SHS dynamic compaction**

Authors: S.K. Mishra, P.K.P. Rupa, S.K. Das, V. Shcherbakov

Journal: Composites Science and Technology (2007)

DOI: <https://doi.org/10.1016/j.compscitech.2006.08.013>

□ **Fatigue damage of a thermal barrier coated Ni-base superalloy**

Authors: B. Goswami, B.R. Kumar, S. Tarafder, G. Krishna, P.K.P. Rupa, S.B. Kumar

Journal: High Temperature Materials and Processes (2007)

DOI: <https://doi.org/10.1515/HTMP.2007.26.3.209>

□ **Characterization of bond coat in a thermal barrier coated superalloy used in combustor liners of aero engines**

Authors: A.K. Ray, B. Goswami, S.K. Sahay, B. Dash, B.R. Kumar, P.K.P. Rupa, E. Dwarakadasa

Journal: Materials Characterization (2006)

DOI: <https://doi.org/10.1016/j.matchar.2006.01.018>

□ **Deposition of nanostructured Si–C–N superhard coatings by rf magnetron sputtering**

Authors: S.K. Mishra, H. Gaur, P.K.P. Rupa, L.C. Pathak

Journal: Journal of Vacuum Science & Technology B (2006)

DOI: <https://doi.org/10.1116/1.2210842>

□ **Nucleation and growth of DC magnetron sputtered titanium diboride thin films**

Authors: S.K. Mishra, P.K.P. Rupa, L.C. Pathak

Journal: Surface and Coatings Technology (2006)

DOI: <https://doi.org/10.1016/j.surfcoat.2005.10.027>

□ **Effect of alumina diluent on the fabrication of in-situ Al₂O₃-Ti/ZrB₂ composite by self propagating high temperature synthesis dynamic compaction**

Authors: S.K. Mishra, P.K.P. Rupa, S.K. Das, V. Shcherbakov

Journal: Metallurgical and Materials Transactions B (2006)

DOI: <https://doi.org/10.1007/s11663-006-0048-1>

International Conference Proceedings

- Development of Intermediate Temperature (550-650°C) 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)
- 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)
- Nanoindentation Studies Of Hard Nanocomposite Ti-B-N Thin Films, PKP Rupa, PC Chakraborty, SK Mishra, AIP Conference Proceedings 1393 (1), 239-240 (2011)
- 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)

Book Chapters

- P. Pal, P.K.P. Rupa, Rheological Characteristics of Al₂O₃-TiO₂ Composite Inks for Direct Ink Writing, Springer Nature Singapore, 2025.
- D. Majumder, P.K.P. Rupa, Preparation and Properties of Pluronic F-127 Based Alumina Inks for Additive Manufacturing, Springer Nature Singapore, 2025.
- P. Pal, P.K.P. Rupa, Printability studies of 97 Al₂O₃-3 TiO₂ composite inks with 1 wt% Methyl cellulose, Akansha Publishing House, 2024.
- D. Majumder, P.K.P. Rupa, Aspects of Printability of Pluronic F-127 based Al₂O₃ Inks, Akansha Publishing House, 2024.
- R. Sudarshan, S. Venkatesh, K. Balasubramanian, P.K.P. Rupa, Effects of Plasma Current on the Microstructure of Solution Precursor Plasma Spray YSZ Coatings, BP International, 2024.
- D. Majumder, P.K.P. Rupa, Three Interval Thixotropy Test (3ITT) of Alumina Dispersed in 14 Wt% Pluronic F-127 Hydrogel and with PVA as Additive, Springer Nature Singapore, 2024.

Invited Talks

- A 5-Day Faculty Development Program on Industry 4.0: Technological Evolution, Techno College of Engineering, 2024: Evolution of Surface Coating Techniques.
- National Thermal Engineer Day, Institution of Engineers, 2023: Metal Hydride Based Cooling Systems
- Faculty Development Program on 3D Printing and Rapid Prototyping, Techno College of Engineering, 2023: Applications of Advanced Materials by Direct Ink Writing
- Faculty Development Program on 3D Printing and Rapid Prototyping, Techno College of Engineering, 2023: Direct Ink Writing - A 3D Printing Technology for Ceramic Materials
- National Science Day Lecture, B.J.R Government Degree College, Hyderabad, 2021: Hydrogen as Renewable Energy
- Five Days' STTP on Recent Advances in Material Science and Engineering, National Institute of Technology, Agartala, 2019: Advances in Thermal Spray Coatings
- Five Days' STTP on Recent Advances in Material Science and Engineering, National Institute of Technology, Agartala, 2019: Hydrogen Storage Materials – Prospects and Applications
- Refresher Course in Material Science, University of Hyderabad, 2019: Hard Coatings
- Refresher Course in Material Science, University of Hyderabad, 2019: Solid State Hydrogen Storage Materials
- Development of Materials for Aerospace Applications, Crescent Institute of Science and Technology, 2018: Advanced Coating For Aerospace Applications

Courses Attended

- 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
- “Instructional Design and Delivery System” Conducted by National Institute of Technical Teachers Training & Research, held at MVGR College of Engineering, Vizianagaram, From 5th June to 10th June 2017.
- “Materials Science in Tribology” Under the Continuous Education Programme (CEP) of DRDO held at Defence Metallurgical Research Laboratory (DMRL), Kanchanbagh, Hyderabad, From 7th Feb. to 11th Feb. 2011

Ph.D. Supervision

- Awarded – 01
- Ongoing – 03

M.Tech. project work Supervision

- Awarded – 15
- Ongoing – 02

Awards and Recognitions

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

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