

Name

Dr. Joydip Joardar

Designation

Scientist-F

Qualification

B.E.(Metallurgical Engineering; NIT-Durgapur),
M.Tech., Ph.D. (Metallurgical & Materials Engineering; IIT-Kharagpur)

Experience

BK21 Research Fellow, Department of Materials Engineering,
Seoul National University, South Korea;
Rhône-Alpes Fellow & Maître-Assistant Associé/Guest Scientist,
Ecole Nationale Supérieure des Mines, France

**Current Research Interest and Expertise**

- **Nanomaterials** (2D-materials viz. 2D-WS₂/MoS₂ and other transition metal sulphides; Intermetallics; MAX phases; Hard materials and cermets (TiCN/WC); Metal-ceramic composites)
- **Powder Metallurgy** (Powder processing and sintering (conventional and rapid sintering))
- **Advanced Material Characterization by X-Ray Diffraction** (2D-High-Intensity Microfocus X-Ray Diffraction, Rietveld analysis, Stress analysis, etc.)

Current Major Projects

- Development of nanostructured transition metal sulfides (2017-2019)
(as Project Leader)
Sponsor: Hindustan Petroleum Corporation Ltd. (HPCL)
Project value (in Rs): ~1 Cr
- Characterization of black shales of Mengampeta bayrite mines (2019-2020)
(as Co-Principal Investigator (with Dr. P.K. Jain (PI) and Dr. S. Chakraborty)
Sponsor: AP Mineral Development Corporation (APMDC)
Project value (in Rs): ~64 lacs

List of papers published (selected 10 in past 10 years)

1. A. Harish Kumar, A.K. Pandey, J. Joardar
"2D-Nanolayered Tungsten and Molybdenum Disulfide: Structure, properties, synthesis and processing for strategic applications"
"Handbook on Advanced Ceramics and Composites for Defense, Security, Aerospace and Energy Applications" (Eds. Y.R. Mahajan and Roy Johnson), **Springer-Nature (2019) (in Press)**.
2. S.S. Sravanthi, S. Ghosh Acharyya, K.V.P. Prabhakar, J. Joardar
"Effect of varying weld speed on corrosion resistance and mechanical behavior of Aluminium-Steel welds fabricated by cold metal transfer technique"
Materials and Manufacturing Processes, (2019) DOI: 10.1080/10426914.2019.1605180.
3. S.R. Reddy, V.V. Bhanu Prasad, S. Bysakh, V. Shanker, J. Joardar, S.K. Roy
"Ferroelectric and piezoelectric properties of Ba_{0.85}Ca_{0.15}Ti_{0.90}Zr_{0.10}O₃ films in 200nm thickness range"
Journal of American Ceramics Society, 102 (2019) 1277-1286.
4. G. Mettela, N. Mammen, J. Joardar, S. Narasimhan, G.U. Kulkarni
"Non-FCC rich Au crystallites exhibiting unusual catalytic activity"
Nano Research, 10 (2017) 2271-2279.
5. K. Murugan, J. Joardar, A.S. Gandhi, B.S. Murty, P.H. Borse,

“Photo induced monomer/dimer kinetics in methylene blue degradation over doped and phase controlled nano-TiO₂ films”

RSC Advances 6 (2016) 43563-43573.

6. R. Kumar, J. Joardar, R.K. Singh Raman, V.S. Raja, S.V. Joshi, S. Parida
“Effect of chromium and aluminum addition on anisotropic and microstructural characteristics of ball milled nanocrystalline iron”
Journal of Alloys and Compounds 671 (2016) 164-169.
7. M.S. Archana, V.V.S.S. Srikanth, S.V. Joshi, J. Joardar
Influence of applied pressure during field-assisted sintering of Ti(C,N)-WC-FeAl based nanocomposite
Ceramics International, 41 (2015) 1986-1993.
8. M.S. Archana, R.C. Gundakaram, Y.S. Rao, V.V.S.S. Srikanth, S.V. Joshi, J. Joardar
“Rapid consolidation of FeAl-Fe₃AlC_x ultrafine composites by mechanically activated field-assisted technique”
Materials Science and Engineering A, 611 (2014) 298-305.
9. M.S. Archana, N. Hebalkar, K. Radha and J. Joardar
“Phase formation during mechanically activated annealing of Cr-40at.%Al”
Journal of Alloys and Compounds 501 (2010) 18-24.
10. K.M. Reddy, T.N. Rao, K. Radha and J. Joardar
“Nanostructured tungsten carbide by thermochemical processing”
Journal of Alloys and Compounds, 494 (2010) 404-409.

Book

1. **Notes on Thermodynamics of Materials**
Joydip Joardar, Shrikant Lele and Palle Rama Rao (2016)
ISBN: 978-93-52583-03-4; TRA-ERF Publication

Patent

1. “A novel method for synthesis of tungsten disulfide nanosheets,”
J. Joardar and M.S. Sylvester
Indian Patent Application No. 1703/DEL/2012).

Conference/Workshop Presentations (Selected 10 in last 10 years)

1. A. Harish Kumar, R. Prathyusha, G. Sai Spandana, B. Padya, V.S.K. Chakravadhanula, A.K. Pandey, J. Joardar
“Nano structured 2D-Tungsten disulfide based composite”
5th International Conference on Powder Metallurgy in Asia (APMA 2019) (February 19-21, 2019)
Pune, India
2. J. Joardar
Invited lecture on “Two-dimensional X-ray diffraction: Basics and case studies”
Workshop on Diffraction and Microscopy (WDM 2018), VNIT-Nagpur (August 25-29, 2018)
Nagpur, India
3. A. Harish Kumar, A.K. Pandey, J. Joardar
“Synthesis and oxidation resistance of nanostructured 2D-WS₂”
24th Congress and General Assembly of the International Union of Crystallography (IUCr)
(August 21-28, 2017)
Hyderabad, India
4. G.S. Spandana, J. Joardar
“Development of 2D-nanolayered WS₂ reinforced aluminium nanocomposites”

- 3rd International Conference on Recent Challenges in Engineering and Technology (ICRCET-17) (September 12-13, 2017)
Tirupati, India.
5. T. Puneeth, A. Harish Kumar, M.S. Sylvester, J. Joardar
"Synthesis of 2D-nanolayered WS₂ and MoS₂"
Invited Lecture at Prof. S.K. Pabi Symposium, 4th International Conference on Advances in Materials and Materials Processing (ICAMMP-IV), IIT-Kharagpur (November 5-7, 2016)
Kharagpur, India.
 6. J. Joardar
"Rietveld method in quantitative XRD"
Invited Lecture at ATMC-2016 Workshop, NIT-Raipur (January 22-23, 2016)
Raipur, India.
 7. M.S. Archana, M. Ramakrishna, P. Chandran, V.V.S.S. Srikanth, S.V. Joshi, J. Joardar
"Synthesis of nanocrystalline FeAl and its role as a binder in Ti(C,N) based nanocomposites"
International Conference on Nanoscience & Nanotechnology (ICONSAT 2012) (January 20-23, 2012)
Hyderabad, India.
 8. M. Sylvester, N. Hebalkar, J. Joardar
"Carbon-doped nanostructured WO₃ by mechanically activated processing"
International Conference on Nanoscience & Nanotechnology (ICONSAT 2012) (January 20-23, 2012)
Hyderabad, India.
 9. J. Joardar
"Basics of Rietveld refinement"
Invited Lecture Series at Workshop on Rietveld refinement
Department of Metallurgical and Materials Engineering, IIT-Madras (May 26-28, 2011)
Chennai, India.
 10. M.S. Archana, M. Sylvester, J. Joardar
"Development of nano-tribomaterials for tool inserts: Role of high energy ball milling"
Invited presentation at the Discussion Meeting on "Present understanding and future prospects of phase and microstructure evolution in severe plastic deformation processes"
Indian Academy of Sciences (February 20-22, 2011)
Coorg, India.

Affiliation to Professional bodies

- Member, The Minerals, Metals and Materials Society (TMS), USA
- Member, American Ceramics Society (ACerS), USA
- Life Member, Indian Institute of Metals (IIM)
- Life Member, Materials Research Society of India (MRSI)
- Life Member, Indian Crystallographic Association (ICA)
- Life Member, Powder Metallurgy Association of India (PMAI)
- Life Member, Tribology Society of India (TSI)

Honors and peer-recognition

- **Invited Foreign Expert Reviewer for European OPUS Project** (2017).
- **Best paper award** at 3rd International Conference on Recent Challenges in Engineering and Technology (ICRCET-17) (Sept 12-13, 2017) **Tirupati, India.**
- **Reviewer for several SCI Journals (Philosophical Magazine and Philosophical Magazine Letters, Wear, Journal of Alloys and Compounds, Powder Technology, Ceramics International, Metallurgical and Materials Transaction A & B, Surface and Coatings Technology, Materials Chemistry and Physics, Journal of Materials Processing Technology, Journal of Nanoparticle Research, Chemical Engineering Journal, Transaction of Indian Institute of Metals, Metals and Materials International)**

- **Invited to conduct a Workshop on Rietveld refinement at Department of Metallurgical and Materials Engineering, IIT-Madras (May 26-28, 2011).**
- Recognized as “**Best Reviewer**” in 2011 by Journal of Materials Processing Technology (Elsevier Journal).
- Recognized as PhD guide (external) in Metallurgical Engineering by Andhra University.
- Received ‘*Rhône-Alpes*’ Fellowship from Région Rhône-Alpes Fédération, France (2003).
- Received ‘*Brain Korea (BK21)*’ Fellowship from the Ministry of Education, South Korea (2000-2002, 2005-2006).

Contact information

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