

# Dr. Mayadhar Debata

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- 1. Designation:** Scientist
- 2. Institution:** CSIR-Institute of Minerals & Materials Technology
- 3. Address:** Advanced Materials Technology Department  
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## 4. Educational Qualifications:

- 12/2000-04/2005      **Doctor of Philosophy (Ph.D)**  
***Thesis Title: “Activated Solid and Liquid Phase Sintering of Tungsten and Its Alloys”***  
Department of Materials and Metallurgical Engineering  
Indian Institute of Technology, Kanpur, INDIA  
*Thesis Supervisor: Dr. Anish Upadhyaya*  
CPI: 7.41
- 12/1998-12/2000      **Master of Technology (M. Tech)**  
***Thesis Title: “Corrosion Behaviour of Sintered Metallic Alloys”***  
Department of Materials and Metallurgical Engineering  
Indian Institute of Technology, Kanpur, INDIA  
*Thesis Supervisor: Prof. G. S. Upadhyaya*  
CPI: 8.4
- 09/1996-07/1998      **Master of Science (M. Sc.)**  
***Specialization: Organic Chemistry***  
P.G. Department of Chemistry  
Utkal University, Bhubaneswar, INDIA  
Overall Marks: 74.8% (*University Gold Medalist*)

## 5. Work Experience:

- 12/2010 - continuing      **Scientist**  
CSIR-Institute of Minerals & Materials Technology  
Bhubaneswar
- 6/2010-12/2010      **Assistant Professor**  
Department of Material Science & Metallurgical Engineering  
Maulana Azad National Institute of Technology (MANIT)  
Bhopal

09/2007-05/2010

**Senior Scientist (Projects)**

Non-Ferrous Materials Technology Development  
Centre (NFTDC), Kanchanbagh, Hyderabad

12/2005-08/2007

**Post-Doctoral Research Associate**

Non-Ferrous Materials Technology Development  
Centre (NFTDC), Kanchanbagh, Hyderabad

**6. Research Expertise:**

- Powder metallurgy processing of refractory metals & alloys
- Activated Sintering
- Sinter-bonding of refractory metals & alloys
- Composite materials
- Porous materials
- Microwave sintering of materials
- Microwave heating of natural Gemstones
- Microstructural characterization & mechanical property evaluation of non-ferrous materials

**7. List of Projects Completed/Ongoing @ CSIR-IMMT (Role as PI):**

Sl. No	Title of Project	Project Category	Funding Agency/ Participating Agencies	Role as defined	Funding	Duration
1	Centre for Special Materials (CSM)	ESC-0401  12 FYP Supra Institutional Project (SIP)	CSIR, New Delhi	<b>Project Leader</b>	<b>Rs. 11.81 Crores</b>	2012-2017
2	Development of Tungsten Alloy (TA) cube and its characterization	GAP-282  (GAP)	DRDL, Hyderabad	<b>Project Leader</b>	<b>Rs. 17.94 Lakhs</b>	Aug 2015 - July 2016 Extn. till Mar 2017
3	Very High Power Microwave Tubes: Design and Development Capabilities (MTDDC)	PSC-0101  12 FYP Network Project (NWP)	CSIR, New Delhi  (CSIR-CEERI is the Nodal Lab)	<b>Project Leader</b>  <i>till 25<sup>th</sup> Aug, 2013</i>	<b>Rs. 129.00 Lakhs</b>	2013-2017
4	Development of TiC and Y <sub>2</sub> O <sub>3</sub> reinforced Magnesium Composites prepared by Powder Metallurgy route for Structural Components	OLP-37	CSIR, New Delhi	<b>Project Leader</b>	<b>Rs. 32.00 Lakhs</b>	2011-2014

5	Development of Mechanically Alloyed Oxide Dispersion Strengthened Tungsten Heavy Alloy by Powder Metallurgy route	OLP-43	CSIR, New Delhi	<b>Project Leader</b>	<b>Rs. 27.00 Lakhs</b>	2012-2014
6	Facility Creation for Large Scale Development of Tungsten based Products	OLP-72	CSIR, New Delhi	<b>Project Leader</b>	<b>Rs. 50.00 Lakhs</b>	Dec 2017 – Nov 2019

### 8. List of Projects currently being carried out @ CSIR-IMMT (Role as Co-PI):

- **GAP-295:** Synthesis and characterization of ODS steels using alternative dispersoids (**Rs. 30.51 Lakhs; Duration: 2017-2020**)
- **SSP-324:** Preparation of Fe-P powder for coating applications (**23.60 Lakhs; Duration: 2017-2018**)

### 9. List of Projects currently being carried out/Completed @ CSIR-IMMT (Role as Team Member):

Sl. No	Title of the project	Project Type/Category	Cost	Govt./ Industry	Duration
1	Development of W/W-Y-Cr based double layer coating structures for plasma facing components	GAP-290	<b>Rs. 27.80 Lakhs</b>	Govt. (BRNS)	2016-2018
2	Reduction roasting and microwave heating of some difficult to treat iron ores for the production of pellet feed concentrate	GAP-293	<b>Rs. 124.80 Lakhs</b>	Govt. Ministry of Steel	2016-2019
3	Extraction of Tungsten values from Hutti gold mine tailings concentrate and scrap: Process flow sheet development, bench scale studies and pilot scale testing	SSP-319	<b>Rs. 292.60 Lakhs</b>	Govt. DMRL, Hyderabad	2017-2019
4	Preparation of Titanium carbide powder from red mud using thermal plasma reactor	SSP-313	<b>Rs. 24.30 Lakhs</b>	M/s. Vedanta Ltd., Lanjigarh	Jan 2017 – Dec 2017
5	Processing of Natural Gemstones for Asthetic Improvement & Value Addition (PNG)	ESC-0206 12 FYP Project (SIP)	<b>Rs. 13.00 Crores</b>	Govt. CSIR, New Delhi	2012-2017

6	Novel Energy Effective Metallic Materials for Automotive and General Engineering Application	ESC-0101 12 FYP NWP	<b>Rs. 150 Lakhs</b>	Govt. CSIR, New Delhi	2012-2017
7	Processing of Oxide Dispersion Strengthened Ferritic Steel Powder by High Energy Ball Milling and its Characterization	GAP-209	<b>Rs. 57.63 Lakhs</b>	Govt. BRNS	2010-2013
8	Making and characterization of pure diamond based windows for optical and radiation applications	GAP-226	<b>Rs. 17.90 Lakhs</b>	Govt. BRNS	2011-2014
9	Innovation Centre for Plasma Processing (ICPP)	FAC-11	<b>Rs. 19.80 Crores</b>	Govt. CSIR, New Delhi	2008-2012

### 10. Sponsored Projects Executed prior to joining CSIR-IMMT:

- Development of engine struts & ramps made of tungsten heavy alloy; Sponsored by Defence Research & Development Laboratory (DRDL), Hyderabad (2006-2008)
- Development of 5mm diameter W-Ni-Cu spheres and 8mm diameter × 75mm length rods; Sponsored by Defence Research & Development Laboratory (DRDL), Hyderabad (2009-2010)
- Development of Porous Bronze filters; Sponsored by Solid State Physics Laboratory (SSPL), Delhi (2009-2010)

### 11. Membership of Professional Societies:

- Indian Institute of Metals (IIM) { *Life Member* }
- Powder Metallurgy Association of India (PMAI) { *Life Member* }

### 12. Special Achievements/Honors and Recognition:

- University Topper in M.Sc (**Gold Medalist**)
- University Topper in B.Sc.
- National Scholarship Recipient (1996-1998)
- GATE Qualified with **95.87** percentile (Yr: 1998; AIR: 64)

### 13. List of Publications:

- M. Debata, T.S. Acharya, P. Sengupta, P.P. Acharya, S. Bajpai and K. Jayasankar, “Effect of high energy ball milling on structure and properties of 95W-3.5Ni-1.5Fe heavy alloys,” *International Journal of Refractory Metals& Hard Materials*, 69 (2017), 170-179 [Impact factor: 2.155].
- A. Kumar, S.K. Pradhan, K. Jayasankar, M. Debata, R.K. Sharma and A. Mandal, “Structural Investigations of Nanocrystalline Cu-Cr-Mo Alloy Prepared by High-Energy Ball Milling,” *Journal of Electronic Materials*, 46 (2017): 1339, [Impact factor: 1.579].
- S. Acharya, M. Debata\*, T.S. Acharya, P.P. Acharya and S.K. Singh, “Influence of nickel boride addition on sintering behaviour and mechanical properties of TiC-Ni based cermets,” *Journal of Alloys and Compounds*, 685 (2016) 905-912 [Impact factor: 3.014].
- S. Swain, S. K. Pradhan, M. Jeevitha, P. Acharya, M. Debata, T. Dash, B. B. Nayak, and B. K. Mishra, “Microwave heat treatment of natural ruby and its characterization,” *Appl. Phys. A* (2016) 122:224, [Impact factor: 1.70].
- A. Kumar, K. Jayasankar, M. Debata, and A. Mandal, “Mechanical alloying and properties of immiscible Cu-20 wt.% Mo alloy,” *Journal of Alloys and Compounds*, 647 (2015), pp1040-1047 [Impact factor: 3.00].
- D. Nayak, N. Ray, R. Sahoo, M. Debata, “Analysis of Tribological Performance of Cu Hybrid Composites Reinforced with Graphite and TiC Using Factorial Techniques,” *Tribology Transactions* (2014); 57(5) [Impact factor: 1.30].
- A. Pandey, K. Jayasankar, P. Parida, M. Debata, B. K. Mishra, S. Saroja, “Optimization of milling parameters, processing and characterization of nano-crystalline oxide dispersion strengthened ferritic steel,” *Powder Technology* (2014) 262, 162-169 [Impact factor: 2.30].
- A. Pandey, H. Palneedi, K. Jayasankar, P. Parida, M. Debata, B. K. Mishra, S. Saroja, “Microstructural Characterization of Oxide Dispersion Strengthened Ferritic Steel Powder,” *Journal of Nuclear Materials* (2013) 437:29-36 [Impact factor: 2.10].
- D. Nayak, M. Debata, “Effect of composition and milling time on mechanical and wear performance of copper-graphite composites processed by powder metallurgy route,” *Powder Metallurgy* (2013) 57(4):265-273 [Impact factor: 0.60].
- M. Debata and A. Upadhyaya, “Effect of Boron Addition on Sintering of Tungsten Based Alloys,” *J. Materials Science*, 2004, v. 39, pp. 2539-2541.
- M. Debata, C. Ghosh and A. Upadhyaya, “Effect of Activators on Sintering of W-Cu and W-Bronze Alloys,” *Transactions PMAI*, 2003, v. 29, pp. 54-60.
- M. Debata and A. Upadhyaya, “Effect of Transition Metal Additives on Activated Sintering of Tungsten-Bronze,” *Transactions PMAI*, 2002, v. 28, pp. 92-102.
- M. Debata and G.S. Upadhyaya, “Corrosion Behaviour of Sintered Ferrous alloys and Ferro-TiC in H<sub>2</sub>SO<sub>4</sub> and NaCl solutions,” *Indian Journal of Engineering & Materials Sciences*, 2001, v. 8, pp. 153-160.

- M. Debata and G.S. Upadhyaya, “Corrosion Behaviour of Mo<sub>2</sub>FeB<sub>2</sub> Based Cermet in H<sub>2</sub>SO<sub>4</sub> and NaCl Solutions,” *Transactions Indian Ceramic Society*, 2001, v. 60, n. 4, pp. 163-166.
- M. Debata and G.S. Upadhyaya, “Corrosion Behaviour of Powder Metallurgy Y<sub>2</sub>O<sub>3</sub> Dispersed Iron- and Nickel-Base Superalloys,” *Journal of Materials Engineering and Performance*, 2001, v. 10, n. 5, pp. 602-607.

#### 14. Thesis Supervised: M.Tech: TWO

Sl. No.	Name of the Student	Title of the Thesis	Name of the Co-Guide	Year of Completion	Present affiliation
1	Mr. Deepak Nayak	Development of Copper-Graphite based hybrid composites by powder metallurgy and their characterization	-	2013	Scientist, CSIR-IMMT, Bhubaneswar
2	Mr. Abhishek Pandey	Processing of Oxide Dispersion Strengthened Ferritic Steel powder by High Energy Ball Milling and its Characterization	Dr. M. Debata	2012	Scientist, CSIR-AMPRI, Bhopal