

Ravi Gautam

Junior Scientist

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Pursuing PhD,

Metallurgical and Materials Engineering,

IIT Madras, Chennai

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EDUCATION

- Pursuing PhD in Metallurgical and Materials Engineering, Indian Institute of Technology, Madras, Chennai, India **(Aug 2014 – till date)**
- B.Tech in Metallurgical and Materials Engineering, National Institute of Technology, Tiruchirappalli, India **(2008 - 2012)**

PROFESSIONAL EXPERIENCE

- Aug 2012 - till date: **Scientist**, Centre for Automotive Energy Materials, International Advanced Research Centre for Powder Metallurgy and New Materials (Department of Science & Technology), Chennai, India
- Aug 2012 - June 2013, **Junior Research Fellow**, Defence Metallurgical Research Laboratory, Hyderabad, India

TECHNICAL SKILLS

- **Materials Preparation and Processing**
 - Rapid solidification processing (melt spinning, suction and injection casting)
 - High Vacuum and UHV melting units
 - Arc melting
 - Induction melting
 - Open die forging
 - Hot and cold rolling
 - Equal Channel Angular Pressing

- Ball milling
 - Jet milling technique
 - **Characterization Techniques Handled**
 - BH Loop Tracer for Hard and Soft Magnetic Materials
 - Pulse magnetizer
 - Magnetic In-Field Press
 - Coercimeter
 - Vibrating Sample Magnetometer
 - Differential scanning calorimeters
 - Thermogravimetric analyzer
 - Three Dimensional Atom Probe (3DAP)
 - Transmission Electron Microscopy (Tecnai20) including CBED and EELS
 - Scanning Electron Microscope
 - X- Ray Diffractometer
 - Various Hardness testing techniques such as Brinell, Vickers, Knoop and Rockwell Hardness
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RESEARCH EXPERIENCE

- **Develop Fe-P based soft magnetic materials for motor as well as alternator application in electric vehicles**
 - Wrought alloy Process: Induction Melting, Open die Forging, Hot and cold Rolling
 - Optimization of DC and AC magnetic properties of alloy by controlling the microstructure
 - Understanding the nucleation and growth mechanism of Fine Ferromagnetic Precipitates Fe₃P in alpha Fe matrix using Small Angle X-ray Scattering, Transmission Electron Microscope and 3D Atom Probe
 - Developed the prototypes (**Claw Pole Alternator and DC motor**) using Fe-P based materials and evaluates the performances of the material in actual applications.
- **Synthesis of high performance Strontium hexaferrite magnetic materials for automotive application.**
 - Synthesis of high grade SrFe₁₂O₁₉ magnet by solid state route without any doping.
 - High Anisotropic ferrites powders were obtained by controlling the microstructure.
- Three Month Internship at **National Institute for Materials Science (NIMS), Ibaraki, Japan** under the guidance of Dr. Kazuhiro Hono.
 - To understand the nucleation and growth of P rich precipitates in Fe-P based alloys using Three Dimensional Atom Probe (3DAP) and Transmission Electron Microscopy (TEM)

- **“Development of Tantalum based high density bulk metallic glasses”** under the guidance of Dr. Bhaskar Majumdar, AMG, DMRL, DRDO, Hyderabad.
 - Two month summer project at the department of **Steel Melting Shop-1, JSL Stainless Ltd, Hisar.**
Title: To Avoid SEN clogging during casting of stainless steel containing Cerium.
 - In-Plant training at **Bharat Heavy Electricals Limited (BHEL, Trichy).**
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RESEARCH BACKGROUND

- Synthesis and Characterization of Hard and Soft Magnetic Materials
 - Rapid Solidification process, Bulk Metallic glass
 - Metal forming process
 - Structure Characterization of Materials
 - Microstructure – magnetic property correlation
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AWARDS AND HONORS

- Received **National Scholarship sponsored by the Govt. of India of Rs 4000 per month for the entire B.Tech duration of 4 years** for ranking among the top five students in the department.
 - **First Prize** in **“Industrial Problem Solving Contest”** in The National Annual Symposium **“METTLE”** held at NIT-Trichy, 2011.
 - **Second Prize** in **Technical Quiz** conducted by **Bharat Heavy Electricals Limited (BHEL, trichy)** at Trichy, 2011.
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PROFESSIONAL SOCIETIES

- Life member of **Electron Microscopy Society of India**
 - Life Member of **Indian Institute of Metal**
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PUBLICATIONS

Effect of Si addition on AC and DC magnetic properties of (Fe-P)-Si alloy
Ravi Gautam, D. Prabhu, V. Chandrasekaran, R. Gopalan, and G. Sundararajan
AIP Advances **6** (2016) 055921

CONFERENCE PROCEEDINGS AND WORKSHOPS

- 1) Oral presentation “**Effect of P additions on the magnetic properties of Fe-Si steels**”
Ravi Gautam, D. Prabhu, U. Gowtham, V. Chandrasekaran, R. Gopalan and G. Sundararajan, NMD-ATM 2017, BITS Pilani, Goa, Nov 2017.
- 2) Oral presentation “**Studies of magnetic properties of Fe-P based soft magnetic alloy**”
Ravi Gautam, D. Prabhu, R. Gopalan and G. Sundararajan, In-House symposium, MME dept., IIT Madras, Chennai, 29th – 30th July 2017.
- 3)
- 4) **Poster presentation entitled “Magnetic and microstructural studies on powder extruded soft magnetic Fe-P alloy”, International conference on magnetism and Magnetic Materials, Magnetic Society of India, Hyderabad, 1-3rd February 2017**
- 5) Conference publication “**High coercive rare earth free SrFe₁₂O₁₉ prepared by conventional ceramic method**”
Ravi Gautam, E. Andharia, R. Rudrarapu, D. Prabhu, V. Chandrasekaran, R. Gopalan and G. Sundararajan, Rare Earth and Future Permanent Magnets and their Application conference (REPM 2016) held at Darmstadt, Germany, 28 August – 1 September 2016
- 6) Poster presentation in 8th Bangalore India Nano, 3-4th March 2016 at The Lalit Ashok, Bangaluru, India
- 7) Oral Presentation “**A new soft magnetic (Fe-P)-Si alloy with low core loss and high magnetic induction**”
Ravi Gautam, D. Prabhu, V. Chandrasekaran, R. Gopalan and G. Sundararajan, MMM/INTERMAG 2016 joint conference - San Diego, 11th – 15th January 2016.
- 8) Oral Presentation “**Structural and Magnetic Studies of low concentration Mn-Substituted Strontium Hexaferrite Prepared via Solid State Route**”
Eesha Andharia, **Ravi Gautam**, Rajshekhar Rudrarapu, M. Manivel Raja, D. Prabhu, R. Gopalan, ICMAGMA 2015, 2 - 4th DECEMBER 2015
- 9) Oral Presentation “**Effect of Silicon additions upon the magnetic properties of Fe-P based soft magnetic alloy**”
Ravi Gautam, D. Prabhu , S.B. Chandrasekhar, V. Chandrasekaran, R. Gopalan and G. Sundararajan, NMD – ATM 2015– Coimbatore, 13-16th NOVEMBER 2015
- 10) National Workshop on “**Orientation Microscopy in SEM and Tem**” organised by EMSI, DMRL Hyderabad from 5th - 6th November, 2015
- 11) Poster presentation “**Synthesis of high Coercivity SrFe₁₂O₁₉ Powders**”
R. Rajeshkhar, **Ravi Gautam**, D. Prabhu, R. Gopalan, International Conference on Magnetic Materials and Applications (ICMAGMA 2014), Department of Physics, Pondicherry University, Pondicherry, 15-17th September 2014.
- 12) Poster presentation “**Evolution and growth of LTP MnBi in Mn-Bi system**”
V.V. Ramakrishna, S.Kavita, D. Siva Prahasam, D.Prabhu, **Ravi Gautam** and R. Gopalan International Conference on Magnetic Materials and Applications (ICMAGMA 2014) Department of Physics, Pondicherry University, Pondicherry, 15-17th September 2014.

13) Poster presentation “**Thermatic Unit of Excellence on Nanomaterials based technologies for Automotive Applications**” The 5th Bangalore Nano, the lalit Ashok, Bangalore, 5th – 7th December 2013

14) Oral presentation “**Development of Fe-P alloy with high saturation induction for automotive applications**”

D. Prabhu, **Ravi Gautam**, S. B. Chandrasekar, V. Chandrasekaran and R. Gopalan
NMD-ATM 2013, IIT (BHU), Varanasi, India, 12th - 15th November 2013
