



**CENTRE FOR
INDUSTRIAL CONSULTANCY AND SPONSORED RESEARCH
INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI – 600 036**

ANNOUNCEMENT NO: ICSR/PR/ANN.24/2018 Dated: 12.01.2018

Applications are invited for temporary posts of "**Junior Research Fellow**" for the "**MIMP**" project on "**High strength ,wear and corrosion resistant steel for high speed rail and elastic clip**" in the Department of **Metallurgical and Materials Engineering**.

Other things being equal, preference will be given to SC/ST candidates.

Duration: Initially for a period of one year. Extendable based on the performance for 3 years.

Sl. No	Designation	Qualification	No. of Post	Fellowship
1	Junior Research Fellow	BE/ B Tech or ME/ M Tech in Metallurgy with sound knowledge in Materials Characterization and Physical Metallurgy (Or) Msc in Physics with sound knowledge in Condensed Matter Physics	02	Rs.25,000/- pm

Research Topic:

Microstructure -Mechanical properties correlations and Advanced Transmission Electron Microscopic studies of steel used for rail track

Description:

The mechanical properties of the steel are dependent on it's microstructure in general. Transmission Electron Microscopy (TEM) studies on the tensile/impact tested samples we would like to study the deformation mechanisms. The microstructure of the material will be studied using conventional bright field/ dark field imaging and/or selected area diffraction patterns. The compositional changes will be studied using energy dispersive X-ray spectroscopy (EDXS) in scanning transmission Electron microscopic (STEM) mode.

In a deeper perspective the structure and composition at nanoscale across different phase boundaries as well as different carbonitride precipitate-matrix interfaces play crucial role in defining the mechanical properties of the material. Using Transmission Electron Microscopy (TEM) we would like to study the above mentioned parameters. The microstructure of the material will be studied using conventional bright field/ dark field imaging and/or selected area diffraction patterns. The structural changes at nanoscale across any interface will be studied by tilting the interface at 'edge on' (parallel to the electron beam direction) condition and then retrieving the phase of the exit face wave function using a set of defocused high resolution lattice images. The compositional changes will be studied using energy dispersive X-ray spectroscopy (EDXS) in scanning transmission Electron microscopic (STEM) mode. Microstructural evolution and phase transformation of the sample with increasing temperature will be studied in-situ using TEM to study the effect of temperature change on the mechanical properties of these steel samples. As a whole the above mentioned study will provide knowledge about the material at nanoscale which in turn helps to tune the processing parameters to develop better material with enhanced mechanical properties.

The coordinator has the discretion to restrict the number of candidates to be called for interview to a reasonable limit on the basis of qualifications and experience higher than the minimum prescribed in the announcement.

Application in the form of Biodata/Resume giving name, date of birth, age, address, full details of educational qualifications (stating the marks, ranks, year of passing), community and experience etc., along with copies of certificates, should reach the following address on or before **31.01.2018. Candidates already working in any project at IIT Madras, should send their application through the Co-ordinator of the project.**

Dr.Sankaran.S /Dr. Somnath Bhattacharyya.
Project Coordinators
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Indian Institute of Technology Madras
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Sd/-
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