



Technical Lecture

Topic: *Atomic Insights on Hydrogen Embrittlement in α -Fe*

Speaker: *Dr. Ilaksh Adlakha*, Department of Applied Mechanics, Indian Institute of Technology, Madras

Date & Time: 20th November, 2019, Wednesday, 15:00 hrs

Venue: MDL Seminar Hall, MMG

All are invited!

Tea will be served at 14:45 hrs

G. Sainath
(For IIM Kalpakkam Chapter)

Abstract

In order to gain insights into Hydrogen embrittlement (HE) mechanisms in α -Fe, we aim to discuss several key issues involving HE such as: a) the dislocation nucleation; b) the crack tip deformation; c) the cohesive strength of grain boundaries (GBs) and d) the dislocation-GB interactions. The presence of hydrogen was found to decrease the critical resolved shear stress required for dislocation nucleation. The co-existence of hydrogen enhanced plasticity and decohesion mechanisms was observed during the examination of the crack tip deformation. Next, the segregation of hydrogen along the interface was found to decrease the cohesive strength by varying magnitude based on the GB character. Finally, we examined the effect of hydrogen on the interactions between a screw dislocation and $\langle 111 \rangle$ tilt GBs in α -Fe. The introduction of hydrogen along the GB was found to increase the dislocation pileup size, thereby increasing the susceptibility for the intergranular failure.