

Heat Treatment Study of IN-RAFM Steel to Improve the Impact Toughness Properties

Abstract

9Cr Reduced Activation Ferritic Martensitic (RAFM) steel indigenously developed in INDIA and named as IN-RAFM steel is currently considered as a structural material for the breeding blanket and fusion reactor design. The mechanical properties of this steel is inherently better than austenitic steel at high temperature. Typically RAFM steels are normalized at high temperature i.e. 980°C for 30 minutes followed by low temperature tempering for longer duration i.e. 760°C for 90 minutes. This normalizing and tempering treatment creates a microstructure of tempered martensite with $M_{23}C_6$ precipitates and MX type carbides. The resulting microstructure determines the mechanical properties of the steel. These microstructures are designed to produce an optimum combination of strength and toughness at high temperature. Lot of properties has been evaluated on the base metal.

Further study will be carried out to improve its mechanical properties by virtue of heat treatment condition and subsequent modification in microstructure. Microstructure characterization will be carried out by optical, SEM and TEM.

Task:

- Understanding the heat treatment process
- Heat treatment of steels.
- Metallography Sample Preparation and Microstructure studies by SEM and TEM
- Impact toughness studies
- Fractography studies

Eligibility: Only students of M.E/M.Tech (Metallurgy / Mechanical / Material Science) branches can submit their application at

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