**Effect of thermo-mechanical treatment in Austenitic condition on flow behaviour of Reduced Activation Ferritic-Martensitic steel**

***Abstract:***

9Cr-1W-0.06Ta Reduced Activation Ferritic-Martensitic (RAFM) steel have been investigated in normalized and tempered (N+T) condition and for thermo-mechanical treated steel (TMT) in Austenitic and ferritic field conditions. This paper is aimed at modelling the flow behaviour of RAFM steel at high temperatures for N+T and TMT conditions. The plots of work hardening rate (θ) vs. stress (σ) revealed transient and stage-III stages of work hardening for both TMT and N + T steels is evaluated. However, the TMT processing increased the work hardening of the steel, as manifested by the shift in θ vs. σ plots to higher stresses at all the temperatures and an increase in the fraction of transient stage of θ vs. σ plot up to a temperature of 773 K. Further, an increase in stress to onset of stage-III and the decrease in rate of dynamic recovery (Stage-III) have been observed for TMT steel, in comparison to the steel in N + T condition. The obtained flow analysis results were correlated with microstructural investigation i.e., Optical, scanning and transmission electron microscopic investigations to assess the microstructural changes of the steel N+T and TMT conditions. Various stages in strain hardening behaviour of RAFM steel is evaluated analytically and compared with microstructural investigations.

***Keywords:*** Reduced Activation Ferritic-Martensitic (RAFM) steel, Thermo-Mechanical Treatment, Scanning Electron Microscopy, Precipitates.