



**Department of Materials Science and engineering
Indian Institute of Technology, Kanpur**



TITLE

Effect of Thermal Cycling Process on Structure and Tensile Flow Properties of Austenitic Stainless Steel

ABSTRACT

Austenitic stainless steels possess an excellent corrosion resistance along with a good weld-ability and good formability. Because of these properties they can be formed into any desired shape, however, the low strength of these materials limits their applications where strength is desirable along with good formability and corrosion resistance. The lower yield strength of austenitic stainless steel can be improved by reducing the grain size of material to nano or ultrafine regime. This talk will give an idea for the production of recrystallized ultrafine grained microstructure possessing high strength and a reasonable ductility from a heavily cold rolled Austenitic Stainless Steel using repeated or cyclic annealing process. The Johnson-Mehl-Avrami-Kolmogorov model for predicting recrystallization process was used to optimize the process parameters for the formation of ultra-fine grained recrystallized microstructure. Ultrafine grained austenitic stainless steel, with two different types of grain size distributions, was studied for tensile deformation behaviour. Further, an attempt was also made to estimate the stored strain energy by a novel approach of micro hardness measurement both over small scale (area $3600 \mu\text{m}^2$) and large scale (area $\sim 0.25 \text{ mm}^2$). The stored strain energy was determined using hardness values. Using these data, spatial stored strain energy distribution contour maps were created. They were, in turn, used to characterize the local softening behaviour both at micro and macro scale. My talk will focus on the mechanism of thermal cycling and its advantage over isothermal annealing treatment.

SPEAKER

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Dr Sailaja Sharma is the institute post-doctoral fellow at Indian Institute of Technology Kanpur. She is working on structure property relationship of austenitic stainless steel with Prof N. P. Gurao. She was awarded her PhD from Indian Institute of Technology Bombay. Her PhD work themes on “Effect of Thermal Cycling Treatment on Structure and Tensile Flow Properties of AISI 304L”. She obtained her Master’s degree in Physics form National Institute of Technology Rourkela. Her research interest includes material characterization and structure property relationship of different class of materials.