

## عنوان مقاله:

Microstructural Evolution and Mechanical Properties of Ultrafine/nano Structured AISI ۳۲۱ Stainless Steel Produced by Thermo-mechanical Processing

## محل انتشار:

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## نویسندگان:

M. Golzar Shahri - *Department of Materials Engineering, Isfahan University of Technology, Isfahan ۸۴۱۵۶-۸۳۱۱۱, Iran*

.M. Salehi - *Department of Materials Engineering, Isfahan University of Technology, Isfahan ۸۴۱۵۶-۸۳۱۱۱, Iran*

S. R. Hosseini - *Department of Materials Engineering, Maleke-ashtar University of Technology, Isfahan ۸۳۱۴۵-۱۱۵, Iran*

## خلاصه مقاله:

The mechanical properties and microstructural developments of ۳۲۱ stainless steel during thermomechanical process were investigated. The repetitive cold rolling and subsequent annealing were conducted to achieve nanocrystalline structure in an AISI ۳۲۱ stainless steel. Heavily cold rolling at  $-۲۰^{\circ}\text{C}$  was conducted to form martensite in metastable austenitic steel. The process was followed by annealing treatment at  $۷۰۰-۸۵۰^{\circ}\text{C}$  for  $۰.۵-۳۰$  min. The effects of process parameters such as "reduction percentage", "annealing temperature", and "annealing time" on the microstructural development were also investigated. Microstructural evolutions were conducted using feritscope, X-ray diffraction and scanning electron microscope (SEM). The mechanical properties were determined by hardness (Vickers method) and tensile test. The results indicated that more thickness reduction made more martensite formation, leading to the rise of hardness. In addition, mechanical evaluations after heat treatments revealed that decreasing austenite grain size to  $۰.۷\ \mu\text{m}$  resulted in hardness and strength increment by adapting Hall-Petch equation.

## کلمات کلیدی:

Austenitic stainless steel, Deformation induced martensite, Nano/ultrafine grain structure, Thermomechanical treatment, Hall-Petch Relationship

## لینک ثابت مقاله در پایگاه سیویلیکا:

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