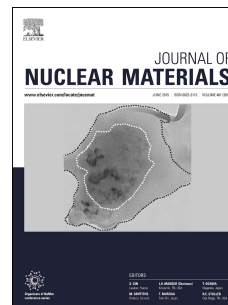


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Short Communication:**Deformation behavior of austenitic stainless steel at deep cryogenic temperatures**

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Abstract

The nonmagnetic austenite steels are the jacket materials for low-temperature superconductors of fusion reactors. The present work provides evidences that austenites transform to magnetic martensite when deformation with a high-strain is imposed at 77K and 4.2K. The 4.2K test is characterized by serrated yielding that is related to the specific motion of dislocations and phase transformations. The in-situ transmission electron microscope (TEM) observations in nanoscale reveal that austenites achieve deformation by twinning under low-strain conditions at deep cryogenic temperatures. The generations of twins, martensitic transformations, and serrated yielding are in order of increasing difficulty.

Keywords: Austenitic steel; Stress-induced evolution; Cryogenic temperature;

Serrated yielding; Martensitic transformation;

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