

## Formation and stabilization of reversed austenite in supermartensitic stainless steel - DTU Orbit (09/11/2017)

### Formation and stabilization of reversed austenite in supermartensitic stainless steel

The formation and stabilization of reversed austenite upon inter-critical annealing was investigated in a X4CrNiMo16-5-1 (EN 1.4418) supermartensitic stainless steel by means of scanning electron microscopy, electron backscatter-diffraction, transmission electron microscopy, energy-dispersive X-ray spectroscopy and dilatometry. The results were supported by thermodynamics and kinetics models, and hardness measurements. Isothermal annealing for 2 h in the temperature range of 475 to 650 °C led to gradual softening of the material which was related to tempering of martensite and the steady increase of the reversed austenite phase fraction. Annealing at higher temperatures led to a gradual increase in hardness which was caused by formation of fresh martensite from reversed austenite. It was demonstrated that stabilization of reversed austenite is primarily based on chemical stabilization by partitioning, consistent with modeling results.

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