

Influence of Plastic Deformation on Low Temperature Surface Hardening of Austenitic and Precipitation Hardening Stainless Steels by Gaseous Nitriding - DTU Orbit (09/11/2017)

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This article addresses an investigation of the influence of plastic deformation on low temperature surface hardening by gaseous nitriding of three commercial austenitic stainless steels: AISI 304, EN 1.4369 and Sandvik Nanoflex® with various degrees of austenite stability. The materials were plastically deformed to different equivalent strains by uniaxial tension. Gaseous nitriding of the strained material was performed in ammonia gas at atmospheric pressure at 703 K (430 °C) and 693 K (420 °C) depending on the material. Microstructural characterization of the as-deformed states and the nitrided case included X-ray diffraction analysis, reflected light microscopy and microhardness. The results demonstrate that a case of expanded austenite develops and that, in particular, strain-induced martensite has a large influence on the nitrided zone.

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