
Characterization of the expanded austenite formed on a AISI 316 L stainless steel by plasma nitriding

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Abstract

In this experimental work, the expanded austenite was formed by the plasma nitriding in a gas mixture consisting of 90%N₂-10% H₂ at a temperature of 420°C during a variable time ranging from 0.5 to 8 h. The expanded austenite was characterized by GDOES, optical microscope and XRD. The growth kinetics of the expanded austenite followed a parabolic regime. In addition, a mechanical model was used to extract internal stress and nitrogen content from the lattice parameters measured by XRD. The calculated mean internal compressive stress values were found to be dependent on the nitriding time. A decomposition of expanded austenite into CrN and ferrite is probably occurring for long treatment times.

Keywords: Plasma nitriding, Kinetics, Expanded austenite, Kinetics, Internal stresses.

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