

Structure and properties of AISI 316L austenitic steel after active screen plasma hydrogen free plasma nitriding

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The work is devoted to hydrogen-free plasma nitriding of AISI 316L austenitic steel (domestic analogue 03X17H14M3). It has been demonstrated that plasma nitriding with an active screen makes it possible to form solid diffusion layers at a temperature of 570 °C. Whereas, without an active screen, the formation of hardened layers in a hydrogen-free medium occurred at a temperature of 600 °C and they had a shorter length. An increase in the duration of the nitriding process with an active screen from 30 to 360 min led to an increase in the thickness of the hardened layers from 20 to 100 μm and an increase in the content of the expanded austenite phase (S phase). An increase in the duration of nitriding is accompanied by a decrease in the corrosion resistance of the treated AISI 316L samples. With a relatively short nitriding time, it was possible to form hard layers up to 20 μm in length while maintaining the high corrosion resistance of the samples.

Keywords: AISI 316L, hydrogen-free nitriding, hardness, wear resistance, corrosion resistance.

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