

The Effect of Processing Parameters on the Characteristics of Surface Layers of Low Temperature Plasma Carburized Austenitic 310S Stainless Steel

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The response of AISI 310 type austenitic stainless steel to the novel low temperature plasma carburizing process has been investigated in this work. This grade of stainless steel has high chromium and nickel content which is helpful for high temperature applications. Also the corrosion resistance of this steel grade is much higher than the other steels. In this experiment, plasma carburizing was performed on AISI 310 stainless steel in a D.C pulsed plasma ion nitriding system at different temperatures in H<sub>2</sub>-Ar-CH<sub>4</sub> gas mixtures. The working pressure was 4 Torr (533Pa approx.) and the applied voltage was 600V during the plasma carburizing treatment. The phase of expanded austenite composed with carbon atoms on the surface was confirmed by X-ray diffraction. Such a carbon supersaturated layer is precipitation free and possesses a high hardness and good corrosion resistance. It was also noticed that the corrosion resistance of this grade will be achieved in lower plasma carburizing temperature.