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**Comparative study of nitrogen expanded phases properties on stainless steels**

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The formation of a supersaturated nitrogen phases was already largely described for austenitics stainless steel and many others studies are on the way to investigate the similar expanded phases on ferritic and martensitic stainless steels. Usually this phase formation is achieved by a plasma assisted nitrided process in low temperatures (300°C to 450°C) producing thin layers with a smooth diffusion profile with very different properties when compared with nitrides. The low temperatures lead to lower diffusion coefficient implicating in longer treatments time, making this kind of treatment not so interesting for industrial purposes. Although, this new metallurgical development can be useful for several areas bringing solutions to improve corrosion and tribological properties, simultaneously. Aiming to show it, this work focused on the characterization of these properties for the three matrix types of stainless steel, the specimens were nitrided between 320°C and 420°C by PAN. The mechanical and chemical properties were investigated by sliding tests and corrosion tests to simulate work applications. Techniques of microscopy, x-ray diffraction, nanohardness and GDOES were also used to determine the microstructure.

**Keywords**

PAN

expanded austenite

nitriding

expanded ferrite

DC plasma