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Study of corrosion and tribocorrosion behavior of plasma nitrided 7075 - T651 aluminum alloy.

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The 7075 aluminum alloy in T651 presents interesting properties in high stressed applications, however, it has low surface properties of hardness and chemical stability. Plasma nitriding is an alternative method of raising surface hardness, fatigue resistance, wear and corrosion of alloys. In this work the corrosion and tribocorrosion behavior of AA7075 - T651 with plasma nitriding treatment were studied in comparison untreated alloy. Corrosion behavior was investigated in 3.5wt%NaCl solution at room temperature performing potentiodynamic polarization test and electrochemical impedance spectroscopy. Tribocorrosion behavior was investigated using a ball-on-plate tribometer, against an alumina ball, under 1N normal load and 1 Hz frequency in 3.5wt%NaCl solution at room temperature. The corrosion results showed that both conditions exhibited pitting corrosion that occurred at corrosion potential. The plasmanitrided alloy presented a concentrated and consequently accelerated corrosion process in the fault regions of the layer formed and the formation of a layer of corrosion products that can act as extra protection. The tribocorrosion results for plasma nitridedalloy indicated a slightly more stable behavior, showing no significant changes in the electrochemical potential during the tribocorrosion test, together with a slightly lower volume and rate of wear.