

Surface characterization of plasma nitrided maraging 300 steel

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Maraging steels belong to a class of high strength steels with the combination of strength and toughness that are among the highest attainable in general engineering alloys. The term maraging is derived from martensite age hardening and denotes the age hardening of a low carbon, iron-nickel lath martensite matrix. These steels typically have very high nickel, cobalt and molybdenum and very low carbon content [1]. For aeronautical components requiring high strength and good wear resistance, such as, slat track, maraging steel possesses high strength, and good wear resistance can be achieved by plasma nitriding process, without sacrificing the strength of the bulk material [2]. In the present work, the surface of maraging 300 steel solution annealed and plasma nitrided was studied by atomic force microscopy (AFM) and microhardness. Samples were solution annealed at 820°C for 1 h and then plasma nitrided by passing the gas mixture of H₂ an N₂ gases in the ratio of 3:1 under vacuum and it was carried out at 480°C for 3 hours. 3D representation of nitrided and un-nitrided samples showed the nitrided samples with peak-valley structure, and the root mean square increase from 52 nm to 73 nm after superficial treatment. Plasma nitriding was effective to increase the microhardness from 331 HV to 1010 HV, and it is associated with the simultaneous aging and the iron nitrides formed.

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References

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