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Effect of nitretation on mechanical Properties and sulfide stress corrosion resistance of forged supermartensitic stainless steel UNS S41426

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Supermartensitic stainless steels (SMSS) are corrosion resistant alloys used as casing and tubulars in the oil and gas prodution. In this application, mandrels for gas or chemical products injection in the wheel are composed of forged and hot rolled seamless tubes. SMSSs used as tubulars are subjected to sulfide stress corrosion cracking (SSC) in sour services with H 2 S and high salinity. Nitriding is a thermochemical treatment used to increase hardness and wear resistance of steels. This surface treatment can be used to improve the performance of SMSSs. In this work a forged SMSS grade UNS S41426 steel was plasma nitrided at 350 ° C, 400 ° C and 570 ° C for 5 h, using gas mixture of 75%H 2 and 25%N 2 . The effects of the microstructure were evaluated by X-ray diffraction and scanning electron microscopy. The effects on mechanical properties were evaluated by slow strain rate testing (SSRT). The average microhardness measured in the surface was 308 HV0.05 in the as received steel, and increased to 341 HV0.05, 441 HV0.05 and 1277 HV0.05 with nitriding at 350 o C, 400 o C and 570 o C, respectivelly. The results were compared to specimens of SMSS not subjected to nitriding treatment.