

Characterization of Martensitic Stainless Steel Japanese Grade AISI 420A

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Abstract : A study of martensitic stainless steel surgical grade AISI 420A produced in Japan was carried out in this research work. The sample was already annealed at about 898°C. The sample were subjected to chemical analysis, hardness, tensile and metallographic tests. These tests were performed on as received annealed and heat treated samples. In the annealed condition the sample showed 0HRC. However, on tensile testing, in annealed condition the sample showed maximum elongation. The heat treatment is carried out in vacuum furnace within temperature range 980-1035°C. The quenching of samples was carried out using liquid nitrogen. After hardening, the samples were subjected to tempering, which was carried out in vacuum tempering furnace at a temperature of 220°C. The hardened samples were subjected to hardness and tensile testing. In hardness testing, the samples showed maximum hardness values. In tensile testing the sample showed minimum elongation. The sample in annealed state showed coarse plates of martensite structure. Therefore, the studied steels can be used as biomaterials.

Keywords : biomaterials, martensitic steel, microstructure, tensile testing, hardening, tempering, bioinstrumentation

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