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Effect of solution treatment temperature on the microstructure of fe-33ni-19cr alloy

Abstract

The effect of solution treatment temperature on the microstructure, phase present and hardness on Fe-33Ni-19Cr alloy was study in this work. The Fe-33Ni-19Cr alloy was experienced a solution treatment process at six different temperatures which are 950 °C, 1000 °C, 1050 °C, 1100 °C, 1150 °C and 1200 °C for 3 hours soaking time followed by water quench. The average grain size was measured by using linear intercept methods ASTM E112. Microstructure of solution-treated Fe-33Ni-19Cr alloy was characterized by using optical microscope and scanning electron microscope (SEM) equipped with energy dispersive x-ray (EDX) spectrometer. The phase present was analyzed using x-ray diffraction (XRD) technique. The Vickers hardness was used to measure the hardness of solution-treated Fe-33Ni-19Cr alloy. Increasing the solution treatment temperatures were increase the average grain size of solution-treated Fe-33Ni-19Cr alloy. In addition, all samples exhibited an equiaxed matrix grain with slight distribution of precipitates particles. The hardness of solution-treated Fe-33Ni-19Cr alloy was decrease as the solution treatment temperature increase.

Keywords

Alloy 800H; Fe-33Ni-19Cr alloy; Grain refinement; Precipitate; Solution treatment