

Erosion and Erosion-Corrosion Behaviors of Sanicro28 Stainless Steel in 3.5% NaCl Environment

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Abstract

Erosion-corrosion behavior of Sanicro28 stainless steel was investigated. Erosion-corrosion tests were performed using slurry impingement rig in a 3.5 wt.% NaCl solution containing 30 g/l of SiO₂ erosive particles with the average size of 315 μ m, at four different velocities of 4, 6, 7.5 and 9 m/s under impingement angles 40 and 90°. The pure erosion tests were also carried out in similar conditions by cathodic protection. The corrosion behavior of the samples in the stagnant condition was studied using electrochemical polarization method. Synergistic effect between erosion and corrosion was calculated. The erosion and erosion-corrosion surfaces were studied using scanning electron microscope (SEM). The results showed lower erosion, erosion-corrosion and synergy rates at impingement angle of 90° as compared with 40°. The evaluation of the mass loss due to erosion-corrosion showed a critical velocity of 6 m/s for Sanicro28 austenitic stainless steel. Positive synergism was obtained under all velocities and impingement angles indicating that cathodic protection could decrease the material loss in erosion-corrosion.

Keywords: Synergism effect, Erosion-corrosion, Sanicro28 austenitic stainless steel

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