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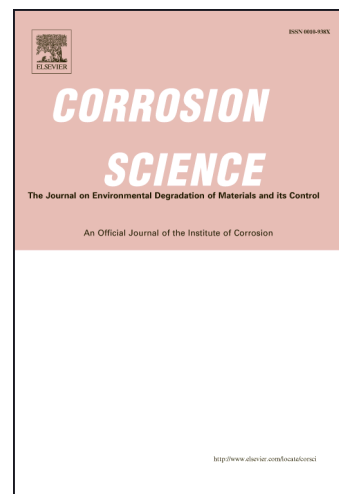
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Internal Oxidation of Alloy 600 Exposed to Hydrogenated Steam and the Beneficial Effects of Thermal Treatment

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Abstract

Alloy 600 in the solution annealed (SA) and thermally treated (TT) conditions was exposed to a hydrogenated steam environment considered to simulate primary water in pressurized water reactors. The likely susceptibility to primary water stress corrosion cracking (PWSCC) was evaluated using the internal oxidation model. A FIB was used to extract cross-sections from Alloy 600 samples and elemental maps were generated; internal oxidation was observed intragranularly in all cases, resulting in expulsion of metallic nickel to the surface. Intergranular oxidation and embrittlement was observed in SA samples, while a thick and dense Cr-rich oxide was formed intergranularly on TT samples.

Keywords: Alloy 600, stress corrosion, internal oxidation, selective oxidation, STEM

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