

Hydrogen Damage of 17-4 Precipitation-Hardening Stainless Steel

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ABSTRACT

In this study, the susceptibility of 17-4 precipitation-hardening stainless steel to hydrogen damage, with and without heat treatment, was investigated in both acidic and neutral solutions, under either open circuit or applied potential condition. The extent of hydrogen absorption was strongly dependent on the solution composition and the applied potential. An increase in brittleness of 17-4 PH stainless steel was observed after cathodic hydrogen charging. This material was also susceptible to hydrogen induced cracking under free loading condition. The susceptibility to hydrogen damage was found strongly affected by the heat treatment applied. A suppression of hydrogen induced cracking could be achieved by solid solution or post peak-aging heat treatments.

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