

研究论文

显微组织对X80钢氢致裂纹敏感性及氢捕获效率的影响

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摘要: 摘要: 本文采用针状铁素体为主的X80管线钢, 通过不同的热处理工艺得到X80管线钢多边形铁素体组织试样和板条马氏体组织试样。分别测试三种组织试样在饱和H2S环境中的氢致裂纹(HIC)敏感性及氢渗透行为。结果表明: 不同组织X80钢的HIC敏感性大小次序为: 水淬处理的板条马氏体组织试样>空冷处理的多边形铁素体组织试样>原始针状铁素体组织试样; 氢在材料中的捕获效率是影响材料HIC敏感性的主要因素之一, 渗氢通量J∞、氢扩散系数Deff越低, 氢捕获效率越高, 管线钢氢致裂纹敏感性越大。

关键词: 材料腐蚀与防护 管线钢 氢致裂纹(HIC)敏感性 渗氢曲线 焊接热影响区

The influence of microstructure on hydrogen induced cracks susceptibility and hydrogen trapping efficiency for X80 pipeline steel

Abstract: Abstract: The X80 pipeline steel based on acicular ferrite was used in this article. Different heat treatment was done on X80 pipeline steel to got different microstructure such as poly ferrite and lath martensite . The HIC behavior of different microstructure of X80 steel was investigated by the hydrogen-induced cracking (HIC) susceptibility test and hydrogen permeation in H2S environment. The result indicates that the HIC susceptibility of different microstructure X80 steel is in the order of: water-quenching> air-cooling>original. Hydrogen trapping efficiency of steel is one of the main factors of HIC sensitive. The more the value of hydrogen flux J∞, hydrogen diffusion coefficient Doff, the fewer pipelines steel is prone to HIC.

Keywords:

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