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GC－4高强度钢化学短裂纹特性研究

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AN INVESTIGATION OF CHEMICAL SHORT CRACK CHARACTERISTICS IN GC-4 HIGH-STRENGTH STEEL

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摘要 采用恒ΔK法对ＧＣ－４钢在３．５％ＮａＣｌ溶液中化学短裂纹特性进行了试验研究。结果表明：恒ΔＫ时裂纹扩展的ｄａ／ｄＮ－ａ曲线存在临界裂纹尺寸ａ。当ａ＜ａ时,显示化学短裂纹效应。ａ值几乎不受加载频率、应力比和ΔＫ水平的影响；化学短裂纹特征扩展速率与长裂纹扩展速率之比是各种力学参量的弱函数。依据分析给出化学短裂纹扩展速率与裂纹尺寸之间的关系。

关键词： 应力强度因子 化学性质－短裂纹 临界点－裂纹几何形状 裂纹扩展

Abstract： method of constant ΔK value is applied experimentally to investigate chemical short crack characteristics in GC-4 high-strength steel in3.5% NaCl solution. experimental results show that there is a critical crack size a on da/dN-a curve of the crack propagation at constant ΔK value. When crack size a < a, chemical short crack effect appears. Loading frequency,stress ratio and ΔK value almost have no effect on a value. The ratio of characteristic crack propagation rate of chemical short crack to that of long crack is a weak function of foading fre-quency,stress ratio and ΔK value. Based on the analysis, the relation between the short crack propagation rate and crack size has been put forward.

Keywords： stress intensity factors chemical properties short cracks critical point-crack geome-try crack propagation

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