

### 论文

#### NT80SS钢在高含H<sub>2</sub>S/CO<sub>2</sub>环境中的腐蚀行为

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摘要:

本文采用失重腐蚀方法研究了NT80SS套管钢在模拟罗家寨气田井下腐蚀环境中腐蚀规律及其腐蚀影响因素(总压、温度、腐蚀时间、Cl<sup>-</sup>、流速), 并采用动电位扫描技术、交流阻抗技术(SEM)和扫描电镜(SEM)分析了腐蚀产物膜电化学特性和形貌。结果表明: 60℃为NT80SS钢在H<sub>2</sub>S/CO<sub>2</sub>环境中腐蚀临界温度, 在此环境中腐蚀速率最低; 当总压大于等于9MPa时, 在温度为120℃环境中腐蚀速率比在相同总压、温度为90℃环境中腐蚀速率小; 随腐蚀时间延长, 腐蚀速率明显降低; Cl<sup>-</sup>离子促进钢的腐蚀; 流速增加, 腐蚀速率增加; 另外, 与其它温度环境相比, 在60℃环境中钢腐蚀产物膜的阻抗能力强、阳极极化率高, 膜的致密性最好, 因此腐蚀速率最低。

关键词: NT80SS; H<sub>2</sub>S/CO<sub>2</sub>共存环境; 腐蚀行为; 腐蚀影响因素

#### CORROSION BEHAVIOR OF NT80SS STEEL IN ENVIRONMENT OF HIGH CONTENTS OF H<sub>2</sub>S AND CO<sub>2</sub>

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Abstract:

Corrosion behavior and corrosion influencing factors(total pressure, temperature, corrosion time, Cl<sup>-</sup>, velocity of flow) of NT80SS casing steels were studied in simulating corrosion environment with high contents of H<sub>2</sub>S and CO<sub>2</sub> in LuoJiazhai Gas Field by loss weight corrosion, and corrosion scale was analyzed by potentiodynamically scan, electrochemical impedance spectroscopy(EIS) and scanning electron microscope(SEM). The results show that 60 °C was the temperature at which corrosion rate of NT80SS steel was the lowest among temperatures tested in this paper. When the total pressure was 9 MPa or above it, corrosion rate at 120 °C was lower than that at 90 °C. However, the total pressure was less than 9 MPa, the result is contrary. Corrosion rate was decreasing with time prolonging; Cl<sup>-</sup> promoted corrosion of steel. Corrosion rate increased with accelerated velocity of flow. The electrochemical experiments show that: in the range of 30 °C-120 °C, Resistance performance and compact character of the corrosion scale formed at 60 °C was the most outstanding among those formed at others temperature, and the anodic polarization rate is high, so corrosion rate of the steel at 60 °C is the lowest.

Keywords: NT80SS steel; H<sub>2</sub>S/CO<sub>2</sub>; corrosion behavior; corrosion factor

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