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会议论文

油套管用P110钢在元素硫环境中腐蚀规律的研究

蔡晓文;戈磊;陈长风;于浩波

中国石油大学（北京）材料科学与工程系 北京 102249

摘要:

通过模拟普光气田元素硫沉积环境，调节腐蚀体系的温度和酸性，利用腐蚀失重法探讨了油套管用P110钢硫沉积环境下的失重规律；用 SEM、EDS、XRD研究产物膜的形态及成分，用电化学方法检测产物膜的离子选择性对腐蚀速率的影响。实验结果表明，元素硫的歧化反应提高腐蚀介质的酸性，增加介质中比Cl^-极性更强的侵蚀性离子HS^-/S^{2-}，因而显著地提高P110钢的腐蚀速率，且随腐蚀温度及时间的增长P110钢腐蚀速率先增大后减小，腐蚀产物由基体侧向外硫含量升高。膜电位测量的结果表明，同一温度条件下，腐蚀速率的增加与产物膜阴离子选择性的增强具有密切关系。

关键词： 元素硫 硫沉积 歧化反应 膜电位

CORROSION BEHAVIOR OF P110 TUBE AND CASING STEEL IN THE ENVIRONMENT OF SULFUR DEPOSITION

CAI Xiaowen; GE Lei; CHEN Changfeng; YU Haobo

Department of Materials Science and Engineering; China University of Petroleum; Beijing 102249

Abstract:

Corrosion rate of P110 steel was investigated by the mass loss method in sulfur deposition environment with different temperature and different acid of the experimental system that simulated the downhole environment of PUGUANG gas field. Meanwhile, the corrosion product scales were analyzed by SEM, EDS and XRD technology, and the method of electrochemistry was used to test the effect of sulfur to corrosion rate. The results showed that the reason why the corrosion rate greatly increased is the disproportionation reaction resulting in the increasing of H^+ and HS^-/S^{2-} which were more aggressive than Cl^-. The corrosion rate firstly increased and then decreased with the temperature and time increasing, and the content of sulfur of corrosion products increased from the matrix to the outer layer. The result of film potential measure indicated that the increasing of corrosion rate was closely related to the inhancing of the anion selective of the corrosion product scales.

Keywords: elemental sulfur sulfur deposition disproportionation reaction film potential

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通讯作者: 戈 磊

作者简介: 蔡晓文, 女,1982年生, 硕士生, 研究方向为金属的腐蚀与防护

通讯作者E-mail: gelei08@eyou.com

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