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研究报告

# 氨基磺酸溶液中烷基咪唑啉对碳钢的缓蚀作用

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**摘要**： 采用失重实验、电化学和扫描电镜等方法研究了2-十一烷基-N-羧甲基-N-羟乙基咪唑啉(UHCI) 在8 mass%氨基磺酸溶液中对碳钢的缓蚀行为。失重实验表明，该缓蚀剂在氨基磺酸溶液中能够有效地抑制碳钢腐蚀，当缓蚀剂的质量分数为0.4 mass%时，碳钢腐蚀速率为0.6370 g/($m^2$•h)，缓蚀效率达到90.12%。极化曲线测试结果表明，该缓蚀剂为混合型缓蚀剂。该缓蚀剂的吸附行为符合Langmuir吸附等温式，吸附机理是一种物理-化学混合吸附。扫描电镜结果也证明 UHCI可有效地抑制氨基磺酸对碳钢的腐蚀。

**关键词**： 碳钢 咪唑啉 电化学阻抗谱 极化曲线 缓蚀

# THE CORROSION INHIBITION OF ALKYL IMIDAZOLINE ON CARBON STEEL IN AMIDOSULPHURIC ACID SOLUTION

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**Abstract**: 2-undecyl-N-carboxymethyl-N-hydroxyethyl imidazoline (UHCI) was investigated as a corrosion inhibitor for carbon steel in 8 mass% amidosulphuric acid solution using weight loss test, electrochemical methods and scanning electron microscopy (SEM) . The weight loss test results showed that the inhibitor was an excellent inhibitor for carbon steel in acid media with an inhibition efficiency of 90.12% and a corrosion rate of 0.6370 g/($m^2$• h) at the mass fraction of 0.4%. The polarization curves indicated that the inhibitor behaved as a mixed type inhibitor. The impedance spectra of carbon steel electrodes changed from one time constant into two time constants when the inhibitor added into the blank solution. The absorption of the inhibitor was found to follow the Langmuir adsorption isotherm and the mechanism was a mixture of chemisorption to physisorption. The results from SEM also give evidence of the effective inhibition of UHCI on carbon steel corrosion in amidosulphuric acid.

**Keywords**: carbon steel imidazoline EIS polarization curve corrosion inhibition

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