Study on the Corrosion Inhibition Performance and Mechanism of Moringa Leaf Extract on Steel in Aminosulfonic Acid

Ping Zhu, Bo Yang*, Hailin Pan,Yunbing Kang,Wuyuan Yang,Kai Li

Special Equipment Safety Inspection Research Institute of Yunnan，Kunming 650228, P.R. China

e-mail address: 43206522@qq.com

Abstract: Moringa leaves are widely used because they are rich in resources and contain a variety of functional components.Moringa oleifera Leaf Extract (MOLE) was obtained by ultrasonic extraction method, and it was used as a corrosion inhibitor in cold rolled steel in 0.10 mol/L NH_2SO_3H in this study.The corrosion inhibition properties and mechanism of MOLE were evaluated by weight loss method, electrochemical method and surface analysis.The results show that MOLE has good corrosion inhibition performance on cold-rolled steel in NH_2SO_3H medium, and the higher the concentration is, the higher the corrosion inhibition rate is.Feurthermore , MOLE of 0.10 g/L has the best corrosion inhibition performance at 30 ℃, at which the corrosion inhibition rate is as high as 91.63%.The adsorption of MOLE on the surface of cold-rolled steel follows the Langmuir adsorption isothermal formula,and which has the effect of corrosion inhibition through mixed adsorption.Both the corrosion and corrosion inhibition processes are controlled by charge transfer.The addition of MOLE can significantly increase the resistance value of charge transfer, and a dense adsorption film is formed on the surface of CRS, by which the corrosion of CRS by H+ and $NH_2SO_3^-$ is effectively prevented, thus achieving better corrosion inhibition performance.The results of XPS, AFM and contact Angle confirm the existence of effective functional groups in MOLE, which reduces the surface roughness and increases the hydrophobicity of CRS.

Keywords: Moringa oleifera leaf extract; Cold-rolled steel; Sulfamic acid; Corrosion inhibition; adsorb

Reference

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