Synergistic Inhibition between Sodium Dietyldithiocarbamate and Hexadecyltrimethylammonium Bromide on the Corrosion of Cold Rolled Steel in Acetic Acid

You Wu, Yu-Lu Shi, Chang-Wei Su, Li-Li Feng, Jun-Ming Guo, Wei Bai

Key Laboratory of Resource Clean Conversions in Ethnic Regions, Yunnan Minzu University, Kunming, 650500, PR China
*E-mail: bw369852147@qq.com

doi: 10.20964/2017.11.69

Received: 31 May 2017 / Accepted: 15 September 2017 / Published: 12 October 2017

Weight loss method, potentiodynamic polarization and electrochemical impedance spectroscopy (EIS) were used to study the synergistic inhibition effect of sodium dietyldithiocarbamate (DDTC) and hexadecyltrimethylammonium bromide (CTAB) for the corrosion of cold rolled steel (CRS) in 0.05 M acetic acid (HAc) solution. It is observed that the combination between DDTC and CTAB is physically adsorbed on the surface of CRS, thus showing excellent inhibition efficiency. In this article, the Hard-Soft Acid-Base (HSAB) principle has used to explain the mechanisms of Synergistic inhibition between DDTC and CTAB. SEM and FT-IR results further validate the corrosion inhibition mechanism we proposed.

Keywords: Cold rolled steel; Corrosion; HAc; Synergistic inhibition effect