The Corrosion Inhibition Effect of Pyrrole Derivatives on Carbon Steel in 1.0 M HCl

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The inhibition effect of new pyrrole derivatives, namely, 13-((4-aminophenyl)sulfonyl)-10,11-dihydro-9H-9,10-[3,4]epipyrrolo anthracene-12,14(13H,15H)-dione (**1**), anthracen-9(10H)-ylidenehydrazine(**2**), (11S,15R)-13-(anthracen-9(10)-ylideneamino)10,11-dihydro-9H-9,10 [3,4]epipyrroloanthracene-12,14-(13H,15H)-dione (**3**), 1,6-bis-(N -hexachloro-5-norbornene-2,3-dicarboximidyl) hexane (**4**) and N-Phenylsulfonyloxy-hexachloro-5-norbornene-2,3-dicarboximide (**5**), against the corrosion of carbon steel in 1.0 M HCl solution has been systematically studied by electrochemical measurements (potentiodynamic polarization measurements –impedance spectroscopy-electrochemical frequency modulation). The results of Potentiodynamic polarization indicate that all pyrrole derivatives are Mixed type inhibitors. Among the studied compounds, exhibited the best inhibition activity of 82.8% at 21×10^{-6} M from compound (**1**). The chemical structure of the synthesized compounds was established by proton and carbon thirteen nuclear magnetic resonance (¹H-NMR), (¹³C-NMR), Fourier transform infrared (FTIR) and mass spectroscopy. Solution analysis (UV–visible spectrophotometric method- Fourier transform infrared [FTIR]) support the above inferences.

Keywords: carbon steel; corrosion inhibition; pyrrole derivatives; HCl; EFM; FTIR

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