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ABSTRACT

Herein, the target compound of S-benzyl-O,O'-bis(2-naphthyl)dithiophosphate (SBOB) as corrosion inhibitor with ultra-long lifespan was successfully synthesized and characterized by elemental analysis, single crystal X-ray diffraction and spectroscopy involving FT-IR, ^{1}H, ^{13}C and ^{31}P NMR. Meanwhile, the inhibition performance and mechanism of SBOB for mild steel (MS) in HCl medium were combined to investigate by weight loss, potentiodynamic polarization, electrochemical impedance spectroscopy, scanning electron microscopy and quantum chemical calculation. The potentiodynamic polarization results indicate that SBOB is a mixed-type inhibitor. All experimental results are in good agreement and reveal that the corrosion inhibition increases with the concentration of SBOB. Weight loss results indicate that the inhibition efficiency decreases with HCl concentration and temperature increasing, but the corrosion inhibition