Study on Scale and Corrosion Inhibition Performance of Ethane-1,2-diaminium O,O'-dicyclohexyldithiophosphate

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Ethane-1,2-diaminium O,O'-dicyclohexyldithiophosphate (Et-DDD) as novel corrosion and scale inhibitor was successfully synthesized by cyclohexanol (C₆H₁₁OH) reaction with phosphorus pentasulfide (P₂S₅) and ethylenediamine (H₂NCH₂CH₂NH₂) in toluene (PhCH₃), while the corrosion and scale inhibition performance of Et-DDD were studied and evaluated in detailed. Study results show that Et-DDD is a mixed-type inhibitor for Q235 steel (S235) in H₂SO₄ and HCl solution. It can be found that the scale inhibition and corrosion inhibition efficiency increased with Et-DDD concentration increasing. Meanwhile, the scale and corrosion inhibitor also can be act as a surfactant, the surface tension of Et-DDD at critical micelle concentration of 14.15 mmol L⁻¹ is 33.47 mN m⁻¹.

Keywords: Synthesis; Corrosion; Scale; Inhibition; Steel.

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