Synthesis of some new bisquaternary ammonium salts as acid corrosion inhibitors for carbon steel

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ABSTRACT

A variety of bisquaternary ammonium salts was prepd. for the first time by reacting N,N,N',N'-tetraallyl-1, 6-hexanediamine with allyl chloride, propargyl chloride, benzyl chloride, and 1-bromododecane in excellent yields (>90 per cent). Inhibition efficiency for different concns. of the synthesized compds. for the inhibition of corrosion of carbon steel in 1 M HCl exposed for 6 h at 60 C was detd. gravimetrically. The bisquaternary salts exhibited excellent inhibition efficiencies (97-99 per cent) in the acidic soln. contg. 400 ppm of the inhibitor. Comparable results were obtained by the electrochem. method using Tafel plots for the inhibition efficiency of the synthesized compds. The adsorption of these compds. on carbon steel surface was found to obey Temkin's adsorption isotherm. The work marked the beginning of constituting an important class of new inhibitors contg. multiple adsorption centers of pos. nitrogens as well as -donor moieties.