Synthesis and study of corrosion inhibition of isoxazolidines for mild steel in acid medium

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ABSTRACT

Several new isoxazolidines having different degree of steric hindrance and hydrophobic alkyl chains are prepd. efficiently using single-step nitrone cycloaddn. reactions. The resultant 1,3-disubstituted isoxazolidines contg. Me, CHMe2 and CMe3 groups at N(1) and alkyl groups C6H13, C10H21, C12H25, C14H29 and C16H33 at C(5) positions are characterized by NMR spectral anal. At lower temp. (-30°C), the NMR spectra revealed the presence of two distinct interconverting forms of the isoxazolidines due to slow nitrogen inversion process. These isoxazolidines are tested for corrosion inhibition of mild steel in 1 M and 5 M HCl at 50-70°C range and in 1 N H2SO4 at 40-70°C range by gravimetric and electrochem. methods. Most compds. show excellent corrosion inhibition efficiency (IE%) in acidic soln. Steric hindrance around the nitrogen centers and hydrophobic chain lengths as well as increase in temp. (in the presence of the inhibitor in the higher concn. range 100-400 ppm) are found to increase the inhibition efficiency of the isoxazolidines. Exptl. results agree with the Temkin adsorption isotherm.