Synthesis and corrosion inhibition study of some 1,6-hexanediamine-based N,N-diallyl quaternary ammonium salts and their polymers

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ABSTRACT

A variety of unsatd. N,N-diallyl compds., capable of undergoing cyclopolymn., are prepd. from 1,6-hexanediamine. Selective monoformylation followed by allylation of the diamine afforded N,N-diallyl-N'-formyl-1,6-hexanediamine (DFH). The DFH was converted into quaternary ammonium monomers N,N-diallyl-N-carboethoxymethyl-N'-formyl-1,6-hexanediamine (DCFH) and N,N-diallyl-N-benzyl-N'-formyl-1,6-hexanediamine (DBFH) by reacting with Et chloroacetate and benzyl chloride, resp. The monomer DCFH on homo- and co-polymn. (with SO2) afforded the polyelectrolytes poly(DFCH) and poly(DFCH-SO2), which on acidic hydrolysis of the amide and ester groups gave the corresponding polyampholytes. The monomer DBFH, likewise, on polymn. followed by acidic hydrolysis gave the corresponding polyelectrolytes. All the synthesized materials (precursor to the monomers, monomers and the polymers contg. quaternary, amide and trivalent nitrogens) and the starting 1,6-hexanediamine were used to study the corrosion inhibition of mild steel in 1 M HCl at 60 °C for 6 h. The % inhibition was in the range 40-93%. There is a dramatic increase in the % inhibition by the synthesized materials in comparison to the starting diamine.