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Quaternary aryl phosphonium salts as corrosion inhibitors for iron in HCl

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Abstract

Cathodic and anodic Tafel extrapolation data for the corrosion inhibition of iron in deaerated 1 M HCl at 22 °C are obtained for five synthesised phosphonium salts, 4-tolyltriphenyl-phosphonium chloride (TTPPC), 4-phenoltriphenylphosphonium chloride (PTPPC), 4-anilinetriphenylphosphonium bromide (ATPPB), 4-benzyl alcoholtriphenylphosphonium chloride (BATPPC), 4-hlorophenyltriphenylphosphonium bromide (CPTPPB), and two commercially available phosphonium salts, tetraphenylphosphonium bromide (TPPB) and methyltriphenylphosphonium bromide (MTPPB). The inhibitor concentrations ranged from 1×10^{-7} to 1×10^{-3} M. The inhibition of iron corrosion in 1 M HCl at 22 °C was found to be in the order TPPB > BATPPC > CPTPPB > PTPPC > MTPPB > TTPPC > ATPPB.

Keywords: polarisation, Tafel region, voltammetry.

(Approx. 8.500 words, 11 tables, 32 figures, 6 reactions/equations and 54 references).