

Accepted Manuscript

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PII: S0925-8388(18)32362-4

DOI: [10.1016/j.jallcom.2018.06.241](https://doi.org/10.1016/j.jallcom.2018.06.241)

Reference: JALCOM 46577

To appear in: *Journal of Alloys and Compounds*

Received Date: 30 January 2018

Revised Date: 13 June 2018

Accepted Date: 19 June 2018

Please cite this article as: A.H. Nahlé, T.J. Harvey, F.C. Walsh, Quaternary aryl phosphonium salts as corrosion inhibitors for iron in HCl, *Journal of Alloys and Compounds* (2018), doi: 10.1016/j.jallcom.2018.06.241.

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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-tolyltriphenylphosphonium chloride (TTPPC), 4-phenyltriphenylphosphonium chloride (PTPPC), 4-anilinetriphenylphosphonium bromide (ATPPB), 4-benzyl alcoholtriphenylphosphonium chloride (BATPPC), 4-chlorophenyltriphenylphosphonium 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).

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