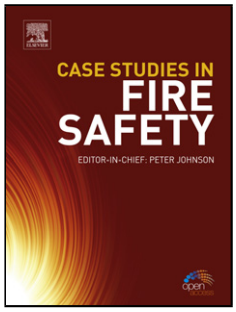

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PII: S0010-938X(17)32136-4
DOI: https://doi.org/10.1016/j.corsci.2018.03.011
Reference: CS 7427

To appear in:

Received date: 29-11-2017
Revised date: 5-3-2018
Accepted date: 7-3-2018

Please cite this article as: Ferreira JM, Oliveira M, Trindade GF, Santos LCL, Tomachuk CR, Development and characterisation of zinc oxalate conversion coatings on zinc, *Corrosion Science* (2010), https://doi.org/10.1016/j.corsci.2018.03.011

Development and characterisation of zinc oxalate conversion coatings on zinc

J. M. Ferreira Jr[a,1], M. Oliveira[b], G. F. Trindade[c], L. C. L. Santos[d], C. R. Tomachuk[e]

[a]*Faculty of Engineering and Physical Sciences, University of Surrey, Guildford, Surrey, UK. Email: jmfj111@hotmail.com.br*
[b]*Energy and Nuclear Research Institute, IPEN, CCTM, Av. Prof. Lineu Prestes, 2242, São Paulo, SP, Brazil. Email: m.marcelodeoliveira@yahoo.com.br*
[c]*Faculty of Engineering and Physical Sciences, University of Surrey, Guildford, Surrey, UK. Email: g.ferraztrindade@surrey.ac.uk*
[d]*Federal University of Bahia – Postgraduate program of Chemical Engineering, R. Prof. Aristides Novis, 2, 2° andar, Federação, CEP 40210-630, Salvador -BA, Brazil. Email: lclsantos@ufba.br*
[e]*Engineering School of Lorena - University of São Paulo, EEL-USP, Environmental and Basic Sciences Department, Lorena, SP, Brazil. Email: celiatomachuk@usp.br*

[1]*Corresponding author and Permanent address: J. M. Ferreira Jr, Federal University of Bahia – Postgraduate program of Chemical Engineering, R. Prof. Aristides Novis, 2, 2° andar, Federação, CEP 40210-630, Salvador -BA, Brazil. Email: jmfj@ufba.br*

Highlights:

- Zinc oxalate coating showed effective protection against corrosion when prepared with low immersion time and conversion bath at temperature ambient.
- Better corrosion protection performances were observed to samples treated with 10^{-1} M oxalic acid solution.
- The zinc corrosion products act as block, forming a barrier protection.
- The consumption of the oxalate layer in the electrolytic solution and the enrichment of the corrosion product by Na with corrosion time were observed.

ABSTRACT: The interactions between oxalic acid and zinc substrates have been studied through the deposition of zinc oxalate coating by immersion. The corrosion behaviour of zinc was investigated by surface observation and electrochemical impedance spectroscopy (EIS). Better protective properties were observed for samples treated with 10^{-1} M oxalic acid compared to other concentrations and the enrichment of corrosion product by Na was observed. The electrochemical results reveal that the oxalate coating increases corrosion protection in corrosive medium. It is proposed that the zinc oxalate coating formed act as a basis for anchoring zinc corrosion products forming simonkolleite improving corrosion resistance.

Keywords: A. zinc, A. organic coatings, A. acid solutions, B. EIS, B. XPS, C. passive films