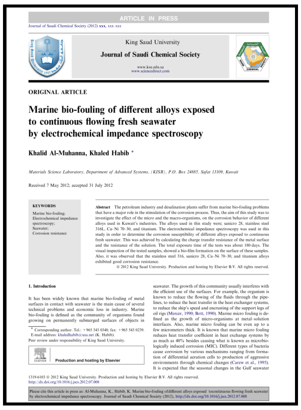
Electrochemical corrosion of marine alloys under flowing conditions

University of Portsmouth, Centre for Chemistry - Marine Corrosion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ORIGINAL ARTICLE

Marine bio-fouling of different alloys exposed to continuous flowing fresh seawater by electrochemical impedance spectroscopy

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KEYWORDS
Marine bio-fouling; Electrochemical impedance spectroscopy; Seawater; Corrosion resistance

Abstract The petroleum industry and desalination plants suffer from marine bio-fouling problems that have a major role in the stimulation of the corrosion process. Thus, the aim of this study was to investigate the effect of the micro and the macro-organisms, on the corrosion behavior of different alloys used in Kuwait's industries. The alloys used in this study were; sanicro 28, stainless steel 316L, Cu–Ni 70–30, and titanium. The electrochemical impedance spectroscopy was used in this study in order to determine the corrosion susceptibility of different alloys exposed to continuous fresh seawater. This was achieved by calculating the charge transfer resistance of the metal surface and the resistance of the solution. The total exposure time of the tests was about 180 days. The visual inspection of the tested samples, showed a bio-film formation on the surface of these samples. Also, it was observed that the stainless steel 316, sanicro 28, Cu–Ni 70–30, and titanium alloys exhibited good corrosion resistance.
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1. Introduction

It has been widely known that marine bio-fouling of metal surfaces in contact with seawater is the main cause of several technical problems and economic loss in industry. Marine bio-fouling is defined as the community of organisms found growing on permanently submerged surfaces of objects in seawater. The growth of this community usually interferes with the efficient use of the surfaces. For example, the organism is known to reduce the flowing of the fluids through the pipelines, to reduce the heat transfer in the heat exchanger systems, to reduce the ship's speed and encrusting of the support legs of oil rigs (Mercer, 1990; Bott, 1990). Marine micro fouling is defined as the growth of micro-organisms at metal–solution interfaces. Also, marine micro fouling can be even up to a few micrometers thick. It is known that marine micro fouling reduces heat transfer coefficient in heat exchange systems by as much as 40% besides causing what is known as microbiologically induced corrosion (MIC). Different types of bacteria cause corrosion by various mechanisms ranging from formation of differential aeration cells to production of aggressive environments through chemical changes (Carew et al., 1995). It is expected that the seasonal changes in the Gulf seawater

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Tags: #Flow #influenced #electrochemical #corrosion #of #nickel #aluminium #bronze

Electrochemical Corrosion Behaviour of 90—10 Cu—Ni Alloy in Chloride

Darby, Corrosion 41 1985 317.

Electrochemical Behaviour Of Copper

Bode magnitude plots for the experiments conducted at various temperatures and flow rates are shown in Fig.

Corrosion behaviour of lead bronze from the Western Zhou Dynasty in an archaeological

Moisture collects at the junction point, acting as an electrolyte and forming a cell in which the two metals serve as electrodes. The polarisation data is used to replicate experimental Reynolds number dependent, corrosion potentials and corrosion current densities over a wide range of electrode angular velocities.

16.8: Electrochemical Corrosion

Adsorbed anti-corrosive component molecules isolate the surface from the corrosive environment alleviating corrosion. Flow influenced electrochemical corrosion of nickel aluminium bronze — Part II. Then the obtained EIS parameters were used to study the effect of the seasonal change of the Gulf seawater on the corrosion behavior of the tested materials.

Marine Corrosion

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16.8: Electrochemical Corrosion

For more or check out our. One common factor in this type of stray current corrosion is missing or undersized negative battery cables between the starting and house batteries.

Marine Corrosion

An eco-friendly green corrosion inhibitor Commiphora Mukul was tested for its efficacy to control material loss in 6061 aluminum alloy under collective influence of mechanical erosion and electrochemical corrosion in a submerged jet impingement rig. A very common cause of corrosion is having two dissimilar metals in contact, as might occur near a fastener or at a weld joint.

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