L2018-086 MONITORING BIOFOULING AND BIOCORROSION. INFLUENCE OF SURFACE PROPERTIES IN BACTERIAL ADHESION TO ALUMINUM ALLOY 6061

Jueves 25 OCT
Thursday 25 OCT
14:50 - 15:15
Sala 1 /Room 1

E. Linardi, O. J. Oppezzo, A. F. Forte Giacobone
Comisión Nacional de Energía Atómica, Buenos Aires, Argentina

Spent nuclear fuel elements from research reactors, made of aluminum alloy (AA) 6061, are stored in demineralized water basins for periods that can reach 30 years. This storage allows the development of complex microbial communities, which adhere forming biofilms, and could promote biocorrosion. In order to limit these risks, a microbiological monitoring program, using AA6061 pickled probes, was established. However, the effect of the surface finish of AA6061 on bacterial adhesion was not considered in the design of the probes. In this work, we evaluate biofilm formation of the type bacterial strain Pseudomonas aeruginosa ATCC 27853, grown in a low nutrient medium, to AA6061 probes with the following treatments: pickling, diamond polishing and sanding. The corresponding surface roughness was assessed by profilometry. Surface hydrophobicity was determined by contact angle measurement. Biofilms were analized by scanning electron microscopy as well as by resuspension and viable counts. The results shown less adhesion to pickled probes that to mirror polishing and sanding. This is not related to roughness or hidrophobicity but to a combination of both. We postulate that the use of pickled AA6061 as probes for biocorrosion could underestimate biofilm development in low nutrient media.

L2018-148 EVALUATION OF DESULFOVIBRIO VULGARIS ADHERENCE ON THREE DIFFERENT POLYMERIC COATINGS

Jueves 25 OCT
Thursday 25 OCT
14:25 - 14:50
Sala 1 /Room 1

M. R. Viera[1,2], S. E. Rastelli[1,2], S. G. Gomez de Saravia[1,2], S. Nicolino[3], V. Rodriguez Bauzada[3], S. Bruno[3], M. Zapponi[3], P. Castro[3]
1 Centro de Investigaciones y Desarrollo en Tecnología de Pinturas La Plata, Argentina
2 Universidad Nacional de La Plata, La Plata, Argentina
3 Tenaris R&D, Campana, Argentina

Microbiological Induced Corrosion is a big concern in oil and gas market, mainly in water injectors and disposal wells in which the alternatives of candidate materials are CRA's with very high PREN (Pitting Resistance Equivalent Number) or coated carbon steel. Organic coatings are used on the tube internal surface to prevent corrosion problems in service. The failure mechanism of these coatings in MIC environments is not well understood. In this study three different types of polymeric coatings were evaluated. Small coated samples were prepared in laboratory and were exposed to Desulfovibrio vulgaris bacteriumin Postgate's C culture medium (initial number of bacteria 106 bacteria/ml). Samples of bare L-80 steel and Cr13 stainless steel were also exposed. Flasks were incubated under anaerobic conditions for 14 days. After one week of exposure, the medium was renewed, replacing half of the exhausted medium with an equal volume of fresh medium. After 14 days, the biofilm development was evaluated using Scanning Electron Microscopy. Tested samples were characterized using FTIR, adhesion tests, color and gloss were measured.