The corrosion resistance of Wiron®88 in the presence of *S. mutans* and *S. sobrinus* bacteria


Received: 2 April 2014 / Accepted: 6 July 2014
© Springer Science+Business Media New York 2015

Abstract The corrosion resistance of Wiron®88, a Ni–Cr–Mo alloy, was evaluated in liquid growth media in the absence and presence of the *Streptococcus sobrinus* and *Streptococcus mutans* strains. Open circuit potential measurements, cyclic voltammetry, linear sweep voltammetry, as well as electronic microscopy coupled to electron diffraction spectroscopy (SEM/EDS), were the main techniques used in this study. It was concluded that the presence of *S. sobrinus* and *S. mutans* have only a slight effect on the corrosion resistance of the Wiron®88 alloy, with the *S. mutans* being slightly more aggressive. For both strains the corrosion resistance *R* is of the same order (kΩ cm²). After 24 h immersion the *S. sobrinus* lead to and *R* of 11.02, while the *S. mutans* lead to of 5.59 kΩ cm². SEM/EDS studies on the Wiron®88 samples, with 24 days of immersion, at 37 °C, have confirmed bio-corrosion of the alloy occurring through the dissolution of Ni as Ni³⁺ and formation of chromium and molybdenum oxides. The bacterial adhesion to the surface is not uniform.

L. Proença - S. Capelo - I. T. E. Fonseca (SD)
CCMM, Departamento de Química e Biocinética, Faculdade de Ciências, Universidade de Lisboa, Campo Grande, Ed. CB, 1749-016 Lisboa, Portugal
E-mail: iffonseca@fc.ul.pt

L. Proença - H. Barroso
Centro de Investigação Interdisciplinar Esgo Montez (CIIFM), Instituto Superior de Ciências da Saúde Esgo Montez, Monte de Caparica, 2820-511 Caparica, Portugal

N. Figueiredo - A. R. Lino
CQB, Departamento de Química e Biocinética, Faculdade de Ciências, Universidade de Lisboa, Campo Grande, Ed. CB, 1749-016 Lisboa, Portugal

S. Capelo
DPADO, Escola de Ciências e Tecnologia, Colégio Luís António Vieira, Universidade de Évora, Rua Romão Ramalho, 99, 7000-671 Évora, Portugal

Published online: 13 January 2015