

Effect of pre-corroded on fatigue behavior of MAO treated ZK60 magnesium alloy in a simulated body fluid

Ying Xiong¹, Jie Yang¹, Yi Yu¹, and Liuyong He¹

¹Zhejiang University of Technology

April 19, 2021

Abstract

A bio-ceramic coating was prepared on the surface of ZK60 magnesium alloys by micro-arc oxidation (MAO) method. The substrate (BM) and coated (MAO) specimens were pre-corroded in a simulated body fluid (SBF) for 12 h. Strain-controlled and stress-controlled loading modes were used to conduct fatigue tests for the two specimens, respectively. The cyclic deformation behavior of the two specimens with non-corroded and pre-corroded was studied. The mechanism of cyclic deformation under different loading conditions is related to twinning and slip. At the same test conditions, the fatigue life of the non-corroded BM specimen is higher than that of the non-corroded MAO specimen, while the fatigue life of the pre-corroded MAO specimen is higher than that of the pre-corroded BM specimen. A modified total strain energy model is proposed and the precision of life prediction is higher than that of traditional fatigue model.

Hosted file

Submitted Manuscript.pdf available at <https://authorea.com/users/408601/articles/518542-effect-of-pre-corroded-on-fatigue-behavior-of-mao-treated-zk60-magnesium-alloy-in-a-simulated-body-fluid>