Abstract

The aim of present study is to investigate the fatigue crack growth behavior of AZ61 magnesium alloy under corrosive environment and effect of stress ratio. Fatigue crack growth behaviors AZ61 magnesium alloy has been investigated to compare with each other which are under the 3.5% NaCl spray environment and laboratory controlled environment (20°C, 55% RH) without corrosion influence. The fatigue crack growth experiment was carried out under various stress ratios, R (R = 0.1 and 0.7) and frequency of 5Hz.

The crack growth curves arranged by effective stress intensity factor (ΔK_{eff}) showed the one curve regardless of stress ratio under laboratory controlled environment. However, those under 3.5% NaCl spray environment did not show the unique curve but the different curves depended on the stress ratio and the kind of test (ΔK-decreasing and ΔK-increasing tests). Influence of corrosion environment on crack growth behavior was observed: lower stress-intensity factor range threshold (ΔK_{th}) and lower crack growth resistance under corrosion environment.