# Environment-Induced Crack Initiation and Early Stages of Crack Growth in Aluminum Alloys, Part 2

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A second group of state-of-the-art contributions[1-4] by invited researchers on the "Environment-Induced Crack Initiation and Early Stages of Crack Growth in Aluminum Alloys" appear in this issue, complementing the articles published in the January 2023 issue of *CORROSION*.[5-8]

The second section includes an overview of the experimental studies of initiation of environment-induced cracking (EIC) in aluminum alloys conducted since the 1950s,[1] showing that crack initiation dominates the total life experienced during both in service life and for smooth tensile test specimens during EIC testing. This also shows that, although research conducted over the last 30 years has focused on EIC propagation, there are exceptions worthy of reevaluation and further study using modern in situ advanced experimental techniques, with particular attention on the role of creep, crack arrest, and surface conditions during crack initiation, especially in the immediate near-surface layers.

The three additional articles in this collection are experimental studies. One investigates the significant differences in EIC initiation observed from fatigue pre-cracks and corrosion-induced fissures under controlled electrochemical conditions in a sensitized AA5456-H116 fracture mechanics test specimen exposed to a marine environment.[2]

The further two articles involve testing conducted on high Zn-content Al-Zn-Mg-Cu 7xxx series alloys:[3-4] one involves two commercial thick plate high Zn-content new-generation alloys,[3] AA7449 and AA7085 in the T7651 temper, and provides a detailed description of EIC initiation and the transition to long-crack growth during exposure to water vapor at 70°C. Information from in situ time-lapse, optical imaging over large areas has enabled the initiation sites to be identified and examined using high-resolution fractography. In the third paper,[4] based on the deformation and fracture behavior examined in situ using synchrotron radiation x-ray tomography, it is proposed that the dispersion of Mn-based second-phase particles provide a novel approach for preventing hydrogen embrittlement in 7xxx series aluminum alloys.

Hopefully the insightful articles in this collection will inspire continued learning and exploration of EIC initiation.

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ISSN 0010-9312 (print), 1938-159X (online) 