Foreword

Deformation, Damage, and Fracture of Light Metals and Alloys

In order to reduce significantly the environmental burdens of society in the twenty-first century, light metals and alloys play an increasingly important role because of their lightweight, high specific strength and stiffness, good corrosion resistance, and high recycle-ability. The three most highly used light metals are magnesium, aluminum, and titanium alloys. These alloys are widely used to manufacture structural components in aircraft, automotive, marine, electronics, and construction industries. These structural components are often subjected to complex forming and loading histories involving deformation, damage, and eventual fracture, which must be anticipated in the design and durability evaluation of structures made from these alloys. A symposium titled "Deformation, Damage, and Fracture of Light Metals and Alloys," was organized at the 142nd TMS Annual Meeting & Exhibition, San Antonio, TX on March 3 to 7, 2013.

This symposium focused on deformation, damage, and fracture of light metals and alloys at room temperature and elevated temperatures in their service environments. The Symposium topics included: (1) deformation/damage/fracture mechanisms in light metals and alloys subjected to various loading conditions, (2) deformation and damage/crack growth in the presence of multiple damage mechanisms such as corrosion, creep, and fretting, (3) alloy development, phase transformation, structural characterization, mechanical properties, residual stress, and in situ characterizations utilizing state-of-the-art techniques (such as neutron and synchrotron scattering), and (4) multi-scale modeling and multi-physics approaches of deformation, damage, and fracture. A total of 56 presentations were delivered by the scientists or researchers from 12 different countries. The selected 9 peer-reviewed articles are collected for publication in this journal.

The symposium was sponsored by TMS Light Metals Division and TMS/ASM: Mechanical Behavior of Materials Committee. We appreciate the help from all the reviewers and staff of *Metallurgical and Materials Transactions* in the preparation of this special block of papers.

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