

Seminar - Series

School of Materials Science and Engineering

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5:00 PM – Room 200 Olin Hall

Corrosion and Fatigue Behaviour of Micro-Alloyed Mg-Alloys

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Abstract:

Due to their low density magnesium alloys are promising light weight materials. For most applications, knowledge concerning their fatigue behaviour under corrosive environmental conditions are a basic requirement. The talk will present results concerning the cyclic deformation behaviour of newly developed micro-alloyed Mg wrought alloys in single step and load increase tests in air and in NaCl solution. The cyclic deformation behaviour was characterised by mechanical hysteresis measurements which were supplemented by measurements of the specimen temperature and the corrosion potential, respectively, according to the environmental conditions. The microstructural changes due to corrosion and/or fatigue loading were examined by light, scanning, and transmission electron microscopy. To evaluate the influence of corrosion on the fatigue process electrochemical investigations were performed without mechanical loading. The resulting relation between the loading amplitude, the cyclic plastic deformation, and the observed microstructural changes are the basis for a mechanism oriented evaluation of the fatigue behaviour of the examined Mg wrought alloys.

Bio:

Prof. Fleck is currently University Professor, Department of Materials Engineering, Institute of Materials Science and Technologies, Technical University Berlin, Berlin Germany. She received her PhD from the University of Essen, in 1995, examining the microstructure and mechanical properties of cortical bone under quasi-static and cyclic loading. Since she has been associated with Department of Materials Science, University of Kaiserslautern, Germany; leading the "Biomaterials" Group(1995-2002) and as lecturer at the Institute for Materials Science I, the University of Karlsruhe (TH), where she was head of the "Microstructure and Properties" Group(2002-2004). Her research interests include material's behaviour in biological systems, fatigue and corrosion behaviour of light metals, structure-property-relationship of biological materials, metals and composites and scanning electron microscopy and energy-dispersive X-ray analysis