

MM 1: Invited talk George

Time: Monday 9:30–10:00

Location: H43

Invited Talk

MM 1.1 Mon 9:30 H43

Salient features of phase stability and mechanical properties of high-entropy alloys — ●EASO GEORGE — Oak Ridge National Laboratory, Oak Ridge, TN, USA

High-entropy alloys (HEAs) are a relatively new class of materials and are of interest because of their potential for useful properties: for example, high strength combined with high ductility and toughness. In this talk, I will review recent progress in understanding phase stability and mechanical properties of face-centered cubic (FCC) HEAs. Phase stability is important because it can have both beneficial and harmful effects on strength and ductility. Decomposition of an ini-

tially single-phase FCC alloy into intermetallic phases causes severe embrittlement whereas a polymorphic FCC to HCP transformation enhances work hardening rate and ductility. The latter involves twinning and/or transformation induced plasticity, both of which correlate with low stacking fault energy. To the extent possible I will explain macroscopic aspects of flow and fracture in terms of salient microscopic features such as dislocation structures, stacking faults, twins and their evolution with strain, temperature and chemical composition. Research supported by the U.S. Department of Energy, Office of Science, Basic Energy Sciences, Materials Sciences and Engineering Division.