

MM 10: HV Wagner

Time: Monday 15:00–15:30

Location: H 0107

Invited Talk

MM 10.1 Mon 15:00 H 0107

Microstructural and mechanical anisotropy of ultra fine grained metals and alloys after ECAP — •MARTIN WAGNER and MATTHIAS HOCKAUF — Institut für Werkstoffwissenschaft und Werkstofftechnik, TU Chemnitz, Deutschland

Severe plastic deformation of metals and alloys by equal-channel angular pressing (ECAP) produces ultra fine grained (UFG) microstructures that often exhibit excellent mechanical properties. However, various subtle requirements make the processing technique challenging both from a materials engineering and a materials science point of view. While research on UFG materials has been en vogue for quite some time, many fundamental aspects relating microstructural evolu-

tion and macroscopic behavior are not fully understood today. In this contribution, we present recent results that provide novel insights into the ECAP technique and the mechanical behavior of UFG materials: (i) we study the effect of back-pressure during ECAP on microstructural homogeneity and anisotropy of Cu and Al-alloys; (ii) we document the evolution of texture, grain size and mechanical properties in a Mg alloy; (iii) we discuss how up-scaling of the ECAP technique to technologically relevant specimen sizes results in gradients and microstructural heterogeneity in large billets; (iv) we use the large-scale ECAP technique to deform specimens along novel, truly 3 dimensional strain paths that activate a larger number of shear planes than the common ECAP paths.