

MM 47: Invited talk Korte

Time: Thursday 9:30–10:00

Location: TC 006

Invited Talk

MM 47.1 Thu 9:30 TC 006

Small experiments but great insights * Plasticity in brittle materials — ●SANDRA KORTE-KERZEL, HARSHAL MATHUR, and SEBASTIAN SCHRÖDERS — Institut für Metallkunde und Metallphysik, RWTH Aachen University, Germany

Hard and brittle materials are used in many modern applications, from semiconductors over wear-resistant coatings to high temperature materials. Although most of their properties are well known, very little is often understood with regards to their plastic deformation. However, failure can frequently occur by just that and the use of promising high temperature materials is often hampered by low temperature brittleness, where a better understanding of the underlying deformation mechanisms could support new alloying strategies. The reason for this

gap in our understanding is due to the experimental difficulties normally encountered in studying plasticity in brittle materials. Due to catastrophic failure during testing, subsequent analysis of deformation mechanisms is impeded and suppression of cracking can conventionally only be achieved by means of confining pressure. Recently, it has been shown that microcompression can help overcome these challenges and therefore plasticity of brittle materials can now be studied relatively easily and in near uniaxial stress-states. By extending this technique to elevated temperatures, deformation mechanisms based on thermal activation of dislocation glide in hard materials become accessible and studies on small single crystalline specimens can shed light on many questions regarding deformation, including plastic anisotropy and the activation of individual slip systems.