MM 10: Invited Talk (Hauptvortrag): Schroers

Time: Monday 15:00–15:30 Location: H24

Invited Talk MM 10.1 Mon 15:00 H24

Materials Science and Development of Complex Materials — •Jan Schroers — Yale University, Department of Mechanical Engineering and Materials Science, New Haven, USA

The increasing demands on materials across fields pose a grand challenge. To meet these demands, increasingly complex materials must be developed which requires strategies and techniques to characterize complex materials. We have developed two strategies to address the structural as well as chemical aspects of this challenge. To understand the relationship between materials' properties and chemistry, we have developed effective combinatorial strategies where we employ combinatorial sputtering which allows us to create approximately 800 different alloys simultaneously. High throughput characterization methods have been developed in our lab and are used to determine properties like glass forming ability in metallic glasses, biocompatibility, and electrochemical. Correlating structure with properties is the holy grail of materials science, yet in most cases very difficult to determine accurately. We have developed a technique that allows one to precisely design or replicate and subsequently realize microstructures in materials including metals, polymers, and ceramics, and to manipulate all features individually and independently. Novel materials often require novel processing methods. As an example, we have uncovered novel processing opportunities using thermoplastic forming, which utilize the dramatic yet continuous softening exhibited by a bulk metallic glass as it approaches its glass transition temperature.