MM 38: Invited Talk: Manja Krüger

Time: Friday 9:30–10:00 Location: SCH/A251

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Alloy design and deformation behaviour of Mo-based silicide materials — •Manja Krueger — Otto-von-Guericke University Magdeburg

Multi-phase refractory metal-based silicide alloys are attractive candidates for high temperature structural applications. The mechanical behaviour and the oxidation response of this type of materials is significantly affected by the microstructural design, i.e. the chemical composition of the solid solution phase, the volume fraction and homogeneous distribution of the solid solution phase and the silicide phases, the grain size and orientation as well as the concentration of dissolved detrimental impurities and impurity phases. Balancing the ambient and high temperature properties requires to tailor the microstructures, which can be realized by the optimization of the chemical composition using additional alloying elements and the modification of alloying concepts with respect to the manufacturing method. However, processing of refractory metals and alloys is quite challenging due to the ultra-high melting point above 2000°C and their strong tendency to oxidize at intermediate temperatures. This presentation will show the successful processing and tailoring of multi-phase Mo-Si-B alloys by powder metallurgical (PM) routes, directional solidification (DS) processes and laser-based additive manufacturing (AM) techniques. It will be shown that the AM materials are crack-free and the constituents are homogeneously distributed. The microstructure is very fine as can be compared to powder metallurgically processed Mo-Si-B.