

MM 1: Invited talk Busch

Time: Monday 9:30–10:00

Location: BAR 205

Invited Talk

MM 1.1 Mon 9:30 BAR 205

Liquid-liquid transition in metallic melts — ●RALF BUSCH — Saarland University, Chair of Metallic Materials, Campus C6.3, 66123 Saarbrücken, Germany

Recently polymorphic transitions within the liquid state termed polyamorphisms have been observed or proposed. In this contribution experiments on kinetics, thermodynamics and structure of molten bulk metallic glass forming alloys in the equilibrium state as well as in the undercooled state are presented

In the case of $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10.0}Be_{22.5}$ (Vit1) we observe sudden changes of viscosity of 2 orders of magnitude [1] that are associated with a latent heat in the absence of crystalline reflexes under

synchrotron radiation. These effects are observed upon cooling and heating and exhibit a pronounced hysteresis. The results suggest that the Vit 1 liquid alloy undergoes a weak first order phase transformation likely from a short range ordered fragile state at high temperatures to a medium range ordered strong state at low temperatures [2]. This behavior is also clearly observed in $Zr_{58.5}Cu_{15.6}Ni_{12.8}Al_{10.3}Nb_{2.8}$ (Vit106a) [3]. The change in fragility can be quantitatively linked to structural changes that are observed by synchrotron radiation [4].

[1]*C. Way, P. Wadhwa, and R. Busch, *Acta Materialia* 55 (2007) 2977–2983. [2]*S. Wei et al. *Nat Comm.* 4 (2013) 2083. [3]*M. Stolpe et al., *Phys. Rev. B* 93, 014201. [4]*S. Wei et al., *Appl. Phys. Lett.* 106 (2015) 181901.