Beitrag ID: **59** Typ: **Poster**

Microstructure and in-situ tensile behavior of CNTs reinforced Mg composites using neutron diffraction

Dienstag, 17. September 2024 21:20 (1 h 40m)

With extremely high elastic modulus, super strength, outstanding thermal and electrical properties, Carbon nanotubes (CNTs) are considered as one of the most potential reinforcements for composites. Our studies indicate that hybrid Mg MMCs, reinforced with SiCp and CNTs, have shown superior tensile properties. This is mainly attributed to the addition of CNTs to SiCp with CVD method.
In this contribution, we will present first a brief introduction on a novel fabrication process of the CNTs reinforced Mg-Zn matrix composites, and then the characterizations of their microstructures and phase by lab X-ray. In-situ tensile deformation test of these composites was performed using neutron diffraction at STRESS-SPEC (MLZ, Garching). Peak position variation with the tensile strain of each phase was analyzed. Bulk texture of both the initial and the tensile to broken samples was also investigated ex-situ by neutron diffraction.
X-ray results showed that in both as-cast and as-extruded materials there exists a precipitate of MgZn2 which are formed during both casting and extrusion processes. The MgZn2 was the only precipitate in ZK60 alloy and composites. The measured pole figures indicated no obvious change of the samples with the addition of CNTs.
Lattice strain evolution via in-situ test indicated SiCp and CNTs reinforcement played a role in carrying internal stress during tensile deformation, and lattice strain showed shaper increase in CNTs reinforced composite than that in SiCp composite and ZK60 alloy, indicating CNTs bear the forces in whole tensile process.

Hauptautor: DING, Chao (Chinese Spallation Neutron Source)

Co-Autoren: HOFMANN, Michael (Heinz Maier-Leibnitz Zentrum (MLZ), TU München); GAN, WEIMIN (Helmholtz-Zentrum hereon GmbH); 杜, 文婷 (散裂中子源科学中心)

Sitzung Einordnung: Mounting Posters, Beer and light Dinner

Track Klassifizierung: Advanced Materials & Processing