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## ADVANCED MATERIALS SCIENCE

Fields of Expertise TU Graz



**Karin Zojer,  
Gregor Trimmel and  
Sergio Amancio,  
Advanced Materials Science**

Source: Lunghammer – TU Graz

**W**e are happy to announce that the FoE Advanced Material Science has a new executive

**team:** Karin Zojer from the Institute of Solid State Physics, Sergio Amancio from the Institute of Material Science, Joining and Forming and Gregor Trimmel from the Institute for Chemistry and Technology of Materials.

Karin Zojer theoretically models transport in disordered solids. Prominent examples of disordered solids are porous materials such as fibre membranes, soils or cement, but also polymer blends. Existing or future applications using these materials require a deep understanding of how the irregular microstructures help to form bottlenecks or “highways” for the transport of charges, energy and particles. For this reason, Karin’s group implements and uses a wide range of theoretical methods to reveal the relationships between microstructure and transport properties. She leads the Christian Doppler lab for mass transport through paper that aims to predict the transport of gases through paper by combining theoretical modelling with experiments to determine microstructures and to quantify transport.

Sergio Amancio, a professor of aviation materials and manufacturing techniques, explores the intricate correlation between joining, additive manufacturing, and material properties across metals, composites and lightweight structures. The emergence of novel aviation propulsion systems, such as liquid hydrogen and fuel cells, will inevitably increase the structural weight of future aircraft, demanding the seamless integration of lightweight materials to maintain structural integrity. This underscores the importance of innovative fabrication methods to address this challenge. Sergio’s research group actively

develops novel techniques to manufacture these hybrid structures, focusing on elucidating bonding formation, interface design and modification mechanisms. Their goal is to tailor the macro-mechanical behaviour of these materials, enhancing performance and efficiency of future airplanes.

Gregor Trimmel was already part of the FoE management team during the last period. Gregor looks at new materials for photovoltaics with a special focus on the preparation of new organic semiconductors, lead-free perovskites as well as inorganic-organic hybrid systems for alternative, printable and flexible solar cells. Currently, research efforts are focusing on the stability of organic photovoltaics and perovskite-organic tandem solar cells. His research interests include the preparation of porous metal sulphide materials, with possible applications in photocatalysis as well as polymer science.

Activities of the FoE: In the 20th call of the initial funding programme of TU Graz, we were able to fund two interesting applications from Alicja Michałowska-Forsyth from the Institute of Electronics, and Petra Spörk-Erdely from the Institute of Materials Science, Joining and Forming. We wish them good luck in their proposal submissions, and we look forward to more submissions at the next call.

Finally, the Advanced Materials Science Poster Day 2024 on 6 February was a huge success. After two excellent talks by Alexander Bergmann and Petra Spörk-Erdely, more than 60 posters were exhibited covering most of the fields within the FoE. Inspiring discussions lasted for more than two hours and a vivid scientific exchange took place accompanied with snacks and drinks. Thank you all for your participation. ●