



## ADVANCED MATERIALS SCIENCE

Fields of Expertise TU Graz

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**Christof Sommitsch,**  
**Advanced Materials Science**

Source: Lunghammer – TU Graz

**S**ustainable construction and building requires smart materials with specific properties such as light weight, optimized heat conductivity and capacity, and corrosion resistance, among others. Today's challenges are intelligent surfaces, compound design and the integration of sensors and functional devices such as for heating and cooling, energy harvesting and translucence.

In the 16<sup>th</sup> call of the initial seed funding of TU Graz, we are happy to finance four in-

teresting and challenging applications in chemistry and physics. The awardees are Markus Koch (Institute of Experimental Physics) with the topic "Ultrafast microscopy to optimize materials for sustainable energy production", Christa Grogger (Institute of Inorganic Chemistry) with her application on "Disilacyclohexadienes as precursors to electronically active materials", Roland Fischer (Institute of Inorganic Chemistry) with research on "Bismuth for REDuctive chemical Energy conversion", and Bernhard Gollas (Institute of Chemical Technologies of Materials) applying for "Redox-flow battery with eco-friendly electrolyte from renewable sources". We are looking forward to extraordinary results and future projects.

On January 26<sup>th</sup> in 2022, we organized the subsequent FoE AMS online update. After the general update by the FoE leadership, there were two very interesting talks.

Florian Feist, senior scientist at the Vehicle Safety Institute gave an overview on the EU-project BreadCell, and Qabar Abbas, visiting researcher at the Institute for Chemistry and Technology of Materials talked about hybrid-supercapacitors made from environmentally friendly components.

The Advanced Materials Poster Day took place on 22<sup>nd</sup> April, 2022, with invited talks as well as a poster show and advanced discussion.

As a contribution to this issue, Sergio Amancio, holder of the BMK Endowed Professorship for Aviation from the Institute of Materials Science, Joining and Forming gives an overview about his research area aviation materials and manufacturing techniques in general, and on ongoing projects relating to the joining of additive manufactured metallic and polymeric parts for mobility applications in particular. ●

**Sergio Amancio**

## Aviation Materials and Manufacturing Techniques

Commercial flights produced about 915 million tonnes of CO<sub>2</sub> worldwide in 2019 [1]. In reaction to this critical situation the European Commission (EC) has recently set the goal of achieving climate neutrality by 2050 [2], which is also an obligation for Austria. One way of accomplishing this target involves the development of greener (e.g. hybrid-electric aircrafts, fuel cell powering electric motors) propulsion systems in lighter and more sustainable aircraft.

The BMK Endowed Professorship for Aviation (B-EPA) is located at TU Graz in the Institute of Materials Science, Joining and Forming (IMAT). B-EPA is co-financed by the Austrian Federal Ministry for Climate

Action, Environment, Energy, Mobility, Innovation and Technology (BMK), and the Austrian companies Diamond Aircraft, voestalpine, TCM International and Fuchshofer. The team led by Sergio Amancio has set >

