

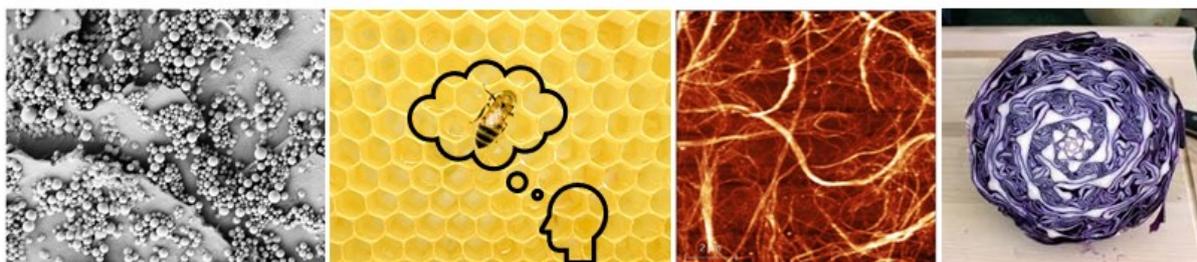
No. **643.261**, Summer semester 2022, Semester hours: 2

Transformation and Shaping of Biobased Systems

Dates: Preliminary organisational talk on 1 March 2022, 5 PM, online:

<https://tugraz.webex.com/tugraz/j.php?MTID=me857a196038117b7b09c82b51acf8c99>.

This lecture starts with a repeating summary of the known molecular building blocks and the supramolecular organization of bio-based substances at the edge between the living and dead matter. Bio-based in this context covers those substances, that can be synthesized by living organisms and their cellular structures and catalysts through biosynthesis. We will take a closer look at those substances that are already being used technically in large quantities in industrial settings (saccharides, oils and fats, proteins, terpenes). Some examples of recent developments in biosynthesis, and their combinations with bio- and chemosynthetic processes are given. The second part of this lecture deals with the targeted processing of these substances into supra-molecularly organized structures in microscopic and macroscopic dimensions. Assemblies can be micelles, particles, micro- and nanofibrils, monolayers. The methods include the so-called self-organization of (macro)molecules through control over their molecular structure and their surrounding environment, as well as the formation of three-dimensional objects using polymer processing methods such as 3D printing and various types of lithographies. Finally, possible applications of these new technologies are discussed.



Aim of the lecture

The students receive a summarizing overview on the peculiarities of those bio-based substances that are currently used technically or biomedically. The students get to know newer scientific techniques that can be used (not exclusively) for the self-organization of bio-based molecules/substances. The students will acquire knowledge on actual research results in the subject of 3D printing and lithographic techniques. The students can interlink the described subject area with practically relevant technical applications in medicine and technology. The students can utilize the obtained knowledge for their work, research, and teaching purposes.

Expected previous knowledge

Basics of general, organic and biochemistry, polymer chemistry, materials science especially of organic substances.

Contact

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