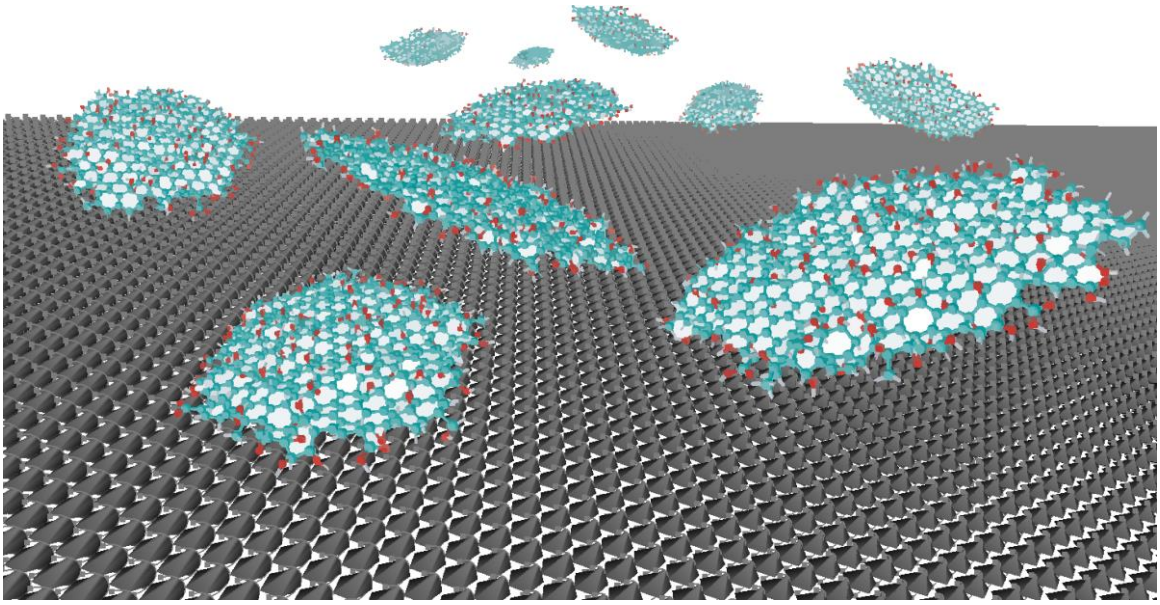
4th Erwin Schrödinger Symposium 2021

of the Erwin Schrödinger Society for Nanosciences

„Advanced Materials“



January 11 - 12, 2021

Online

1st day: https://zoom.us/j/92815377029?pwd=V3NpcUF4ZGdxQmRNWHFyZmp1SElwUT09

2nd day: https://zoom.us/j/96938446312?pwd=SzRBUWM4bkc4SWEyZm42U2o3SmdOQT09

http://www.esg-nano.ac.at/

Chair: Wolfgang Kautek

Organization committee: Oskar Armbruster, Eva Ehmoser, Wolfgang Kautek, Aida Naghilou

Foreword

The **4th Erwin Schrödinger Symposium 2021** of the Erwin Schrödinger Society for Nanosciences **“Advanced materials”** is intending to instill vivid scientific communication and discussion in synthetic, biogenetic, and biomimetic Advanced Materials in respect to their fabrication methods, characterization properties, size effects, applications, and modelling for relating features and structures.

This symposium is organized by the Erwin Schrödinger Society for Nanosciences in a series of successful predecessor events, the **1st Erwin Schrödinger Symposium 2014 “Two Dimensional Nanostructures”** (November 2014, Vienna, Austria), the **2nd Erwin Schrödinger Symposium 2016 “Zero Dimensional Nanostructures: Science and Technology of Nanoparticles”** (May 2016, Vienna, Austria), and the **3rd Erwin Schrödinger Symposium 2018 „Progress in Interfacial Nanosciences“** (June 2018, Dornbirn, Austria).

International experts will illustrate the importance of Advanced Materials in future applications. The conference features active discussions in oral sessions.

Vienna, January 2021

Wolfgang Kautek
(Chair of the 4th Erwin Schrödinger Symposium 2021
& Vice President of the Erwin Schrödinger Society for Nanosciences)

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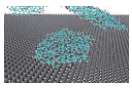


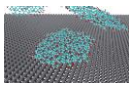
Lecture 5

Biomimetic and bio-inspired advanced materials

Ille C. Gebeshuber[1], Gloria Rose[2], Anna Pavlicek[2], André Gazsó[2]

[1] Vienna University of Technology
[2] Austrian Academy of Sciences

This invited lecture explores bio-inspired and biomimetic nanomaterials, differentiating between bio-inspired or biomimetic nanotechnology and bio-nanotechnology. Following a clarification of these terms, the basics of bio-inspired and biomimetic nanomaterials are presented. Subsequently, a systematic classification of synthetic methods of bio-in- spired and biomimetic nanomaterials is given, based on the method of manufacturing and not on the functionality of the materials. This enables a more coherent correlation with safety aspects, which are yet to be defined in many cases. Due to the great variety, a categorization according to material properties or material compositions is not considered practical. In addition to chemical properties, physical parameters such as size, structure and surface quality play an important role in the categorization. In summary, it can be said that bio-inspired and biomimetic nanomaterials represent important base materials as so-called functional advanced materials in research, development and industry – provided that the material development is accompanied by a corresponding safety and sustainability-oriented technology assessment.



Lecture 13

Antibacterial Surface Structures of Cicada Wings and Technical Replication.

Alexander M. Bürger, Richard van Nieuwenhoven, Ille C. Gebeshuber

Technical University - E 134

Recent studies show that the wings of some insects such as cicadas and dragonflies reveal amazing properties. Not only are they super-hydrophobic, comparable to the famous lotus leaf, but also capable of actively killing bacteria. The underlying mechanism is not a chemical bactericide, but tiny nanostructures that mechanically destroy the bacterial cells.

This study will investigate the surface structure of two New Zealandian cicada species (Amphipsalta cingulata and Kikihia scutellaris) with various methods such as AFM. The main focus lies on the investigation of antibacterial structure properties via bacterial tests and on establishing low-cost bioimprinting technique to transfer these structures to artificial surfaces which would open a huge field of manifold applications such as hospital surfaces, medical instruments, smartphone displays and door handles.