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Antibacterial Structures Inspired by Cicada Wings

A. M. Bürger, R. W. van Nieuwenhoven, L. L. E. Mears, K. Whitmore and I. C. Gebeshuber*
Vienna University of Technology, Vienna, Austria; * gebeshuber@iap.tuwien.ac.at

C. Simon
University of Connecticut, USA

P. Kienzl and A. Elbe-Bürger
Medical University of Vienna, Austria

The antibacterial properties of cicada wings originate from pillar-like nanostructures with species dependent heights between approximately 50 nanometers and 300 nanometers and a tip-spacing of about 180 nanometers. These multifunctional nanostructures are also super-hydrophobic and self-cleaning. This study presents investigations of the two New Zealand cicada species *Amphipsalta cingulata* and *Kikihia scutellaris* as well as of the US American cicada species *Magicicada septendecim* with various methods such as Atomic Force Microscopy AFM, Focused Ion Beam Scanning Electron Microscopy FIB-SEM 3D-Tomography and bacterial tests with live/dead staining. The surfaces investigated comprise the cicada wings themselves, negative imprints of the wings made with the molding material polyvinyl siloxane PVS (Coltene President The Original Extra light body, Altstätten, CH) and positive imprints in various resins. The main focus lies in establishing low-cost bioimprinting techniques for the transfer of the antibacterial properties to man-made surfaces such as hospital surfaces, medical instruments, smartphone displays and door handles. This opens new approaches in dealing with multiresistant bacteria.

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