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Igor Zlotnikov
Max Planck Institute of Colloids and Interfaces, igor.zlotnikov@mpikg.mpg.de

Bernd Bayerlein
Max Planck Institute of Colloids and Interfaces

Benny Bar-On
University of the Negev

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[1] B. Bayerlein, P. Zaslansky, Y. Dauphin. A. Rack, P. Fratzl and I. Zlotnikov, "Self-similar mesostructure evolution of the growing mollusc shell reminiscent of thermodynamically driven grain growth", Nat. Mater. 13, 1102–1107 (2014).

PERFORMANCE OF A SINGLE INTERFACE IN A BIOCOMPOSITE STRUCTURE MEASURED USING MICROCANTILEVER MODULATION EXPERIMENT

Igor Zlotnikov, Max Planck Institute of Colloids and Interfaces, 14476 Potsdam, Germany
Igor.zlotnikov@mpikg.mpg.de
Benny Bar-On, Ben-Gurion University of the Negev, 84105 Beer-Sheva, Israel
Bernd Bayerlein, Max Planck Institute of Colloids and Interfaces, 14476 Potsdam, Germany

Biological mineral-organic composite materials are known to be tough, stiff, stable, viscoelastic bodies capable to creep, recover, absorb energy and even filter particular vibrations. This exceptional mechanical functionality is associated with intricate hierarchical architectures of biocomposites which often consist of stiff mineral units surrounded by extremely thin organic interfaces. The latter play a critical but poorly understood role in the unique static and dynamic performance of the bulk. In this work we propose a new method to study static and dynamic mechanical performance of a single thin interface in a biocomposite structure which is based on force modulation experiment (performed using nanoindentation instrumentation) of a microbeam containing one individual interface (prepared by Focused Ion Beam milling technique) – Figure 1. The validity of the proposed method is confirmed by a successful measurement of known elastic modulus and damping coefficient of 1 µm thick organic interfaces in the calcitic prismatic structure in the marine shell *Pinna nobilis* [1].

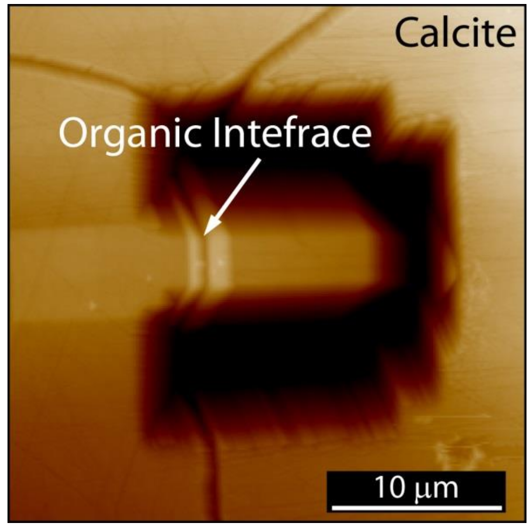

Figure 1 – Topography map of a cantilever.

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