

Colloquium Max Born Institut

May 28, 2015

BIOMIMETIC FUNCTIONAL SURFACES: FROM GECKOS TO GECOMER® TECHNOLOGY

Eduard Arzt

INM - Leibniz Institute for New Materials and Saarland University; Campus D2 2, 66123 Saarbruecken, Germany

At INM, we develop and investigate new micro- and nanopatterned surfaces for diverse functionalities ranging from anti-reflection to electric storage. An area of emphasis is the exploitation of bio-inspired polymeric features to create mechanically active surfaces (“gecko effect”). We have studied, both experimentally and theoretically, the adhesion enhancement by micropatterning polymeric surfaces and developed an understanding of the effects of feature size, aspect ration, and shape. The adhesion based on van der Waals interactions is reversible, residue-free and works in vacuum. Using different stimuli, the surfaces can be switched between an adhesive and a non-adhesive state. Besides studying fundamental mechanisms, the current emphasis is on engineering of switchable adhesive surfaces and on interaction with skin and tissue. Our resulting Gecomer® technology is of interest in robotics and handling, sports devices, biomedical implants and in outer space.

CV of Eduard Arzt

Scientific Director of INM – Leibniz Institute for New Materials, Saarbruecken, Germany; Professor at Saarland University. PhD in physics, University of Vienna, 1980. Postdoc, Cambridge University, UK. Director, Max Planck Institute for Metals Research (now Max Planck Institute for Intelligent Systems), Professor of Metals Physics at the University of Stuttgart (1990-2007). Visiting research: Stanford University; Massachusetts Institute of Technology; University of California, Santa Barbara and San Diego; Technion, Haifa, Israel. Awards: Max Planck Research Award, Acta Materialia Outstanding Paper Award, Leibniz Prize, Advanced Grant by the European Research Council (ERC). Member, Austrian Academy of Sciences; German Academy of Sciences Leopoldina. Highly cited materials scientist. Editor, *Progress in Materials Science*.