

SEMINAR SERIES

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Self-healing Vascular Nanotextured Materials

Featuring Dr. Alexander Yarin
University of Illinois, Chicago



Friday, Sept. 16 | 12:00 - 1:15 pm | H&K 112

PRESENTATION ABSTRACT

The talk is devoted to an overview of recent work on self-healing nanotextured vascular materials, their physics, chemistry and mechanical behavior, as well as applications. It describes the healing agents used in engineering self-healing materials and the fundamental physicochemical phenomena accompanying self-healing. The talk also addresses several different fabrication methods used to form core-shell nanofiber mats, in particular, coelectrospinning and solution co-blowing. The talk also mentions some relevant theoretical aspects, such as viscoelastic effects, critical (catastrophic) and subcritical (fatigue) cracks and their growth. The adhesion and cohesion energies are introduced as well, and the theory of the blister test for the two limiting cases of stiff and soft materials is developed and implemented experimentally to characterize delamination mechanisms which are to be suppressed in self-healing materials. Applications of self-healing material for corrosion protection are also demonstrated.

ABOUT DR. YARIN

MSc-1977 (in Applied Physics) at the Physico-Mechanical Dept. of The Leningrad Polytechnic Institute, PhD (in Physics and Mathematics)-1980 at The Institute for Problems in Mechanics of the Academy of Sciences of the USSR, Moscow, DSc (Habilitation, (in Physics and Mathematics)-1989 at The Institute for Problems in Mechanics of the Academy of Sciences of the USSR, Moscow. Affiliations: The Institute for Problems in Mechanics of the Academy of Sciences of the USSR, Moscow (1977-1990); Professor at The Technion-Israel Institute of Technology (1990-2006; Eduard Pestel Chair Professor in Mechanical Engineering at The Technion in 1999-2006); Distinguished Professor at The University of Illinois at Chicago, USA (2006-present); Fellow of the American Physical Society. Prof. Yarin is the author of 5 books, 12 book chapters, 426 research papers, and 12 patents. Prof. Yarin was the Fellow of the Rashi Foundation, The Israel Academy of Sciences and Humanities, and was awarded The Gutwirth Award, The Hershel Rich Prize, and The Prize for Technological Development for Defense against Terror of the American-Technion Society. He is one of the three co-Editors of the 'Springer Handbook of Experimental Fluid Mechanics', 2007, the Associate Editor of the journal "Experiments in Fluids", and one of the members of the Editorial Advisory Boards of the journals 'Physics of Fluids', the Bulletin of the Polish Academy of Sciences, and 'Archives of Mechanics'.

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