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**Biopolymer derived nanofibers and their applications as biomedical materials and adsorbents for heavy metals removal from polluted water**

Solution blowing of such plant derived biomaterials as soy protein, zein, lignin, oats, sodium alginate and cellulose acetate and such animal derived biomaterials as silk protein (sericin), chitosan and bovine serum albumin was demonstrated as a versatile, robust and industrially scalable approach to form monolithic and core-shell nanofibers from bio-waste. Mechanical properties of such nanofiber mats were investigated. The collected nanofiber mats were also bonded both chemically (using aldehydes and ionic cross-linkers) and physically (by means of wet and thermal treatment) to increase the tensile strength to widen the range of applications of such green nonwovens. Fluorescent dye Rhodamine B was used as a model hydrophilic drug in controlled release experiments after it had been encapsulated in solution-blown soy protein-containing hydrophilic nanofibers and the release kinetics associated with dye desorption was studied in detail. Also, the antibacterial activity of solution-blown soy protein nanofiber mats decorated with silver nanoparticles was studied. Nanofiber membranes containing such biopolymers as lignin, oats, soy protein, sodium alginate and chitosan were used for heavy metals adsorption from aqueous solutions in equilibrium in the batch experiments, as well as under the throughflow conditions. The results revealed attractive capabilities of these inexpensive nano-textured biopolymer adsorbents formed from waste materials using the process scalable to the industrial level. The results also elucidated the physicochemical mechanisms of heavy metal adsorption on biopolymers.

**Biography**

Alexander L Yarin has pursued his MSc in Applied Physics, PhD in Physics and Mathematics and Doctor of Science Habilitation in Physics and Mathematics from The Institute for Problems in Mechanics of the Academy of Sciences of the USSR, Moscow. He has been a Professor at The Technion-Israel Institute of Technology and currently is a Distinguished Professor at The University of Illinois, USA. He is the author of 4 books, 12 book chapters, 310 research papers and 6 patents. He was the Fellow of the Rashi Foundation, The Israel Academy of Sciences and Humanities and was awarded Gutwirth Award, Hershel Rich Prize and Prize for Technological Development for Defense against Terror of the American-Technion Society. He is one of the three Co-Editors of Springer Handbook of "Experimental Fluid Mechanics" and the Associate Editor of the journal *Experiments in Fluids*.

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