

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Size-dependent behavior of electrospun polymer nanofibers under small deformation ARKADII ARINSTEIN, EYAL ZUSSMAN, Technion — A model describing a mechanism resulting in size-dependent behavior of electrospun polymer nanofibers under small deformation is proposed. According to this model, the polymer matrix of the nanofibers consists of correlated groups of chains/subchains, partially oriented along the fiber. These supermolecular structures which were formed during electrospinning are confined by the fiber boundary. Thus, when the fiber elongates under external force the relative rotations of these correlated regions are hindered. As a result the elastic modulus depends on the diameter of the deformed fiber. In case of small fiber diameters this restriction is dominant while this effect decreases with increase of fiber diameter, and tends to zero for large fiber diameters according to square-law which was verified by experimental observations.

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Date submitted: 19 Nov 2010

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