

Abstract Submitted
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Mechanical Properties of Nanofibers Revealed by Interaction with Streams of Air YINAN LIN, DANIEL CLARK, DARRELL RENEKER, The University of Akron — Measurements of mechanical properties of electrospun nanofibers are needed for process control [1] and for design of structures that are durable, conformal and hierarchical. A new method, complementing measurements made on miniature mechanical testing devices [2], was developed. Electrospun nanofibers were captured directly between two steel rods that functioned “grips.” Tensile deformation was applied by separating grips. The stress information was revealed by the deflections of the nanofibers caused by forces from broad streams of air, flowing perpendicularly to the fibers, at measured velocities. Glints of reflected light that revealed the contour of the deflected nanofibers were recorded with a camcorder. Image analysis of the shapes of the nanofibers was combined with scanning electron microscopy measurements of the diameter of the ends to evaluate the mechanical properties. Stress strain curves and hysteresis loops of selected ultrathin electrospun fibers were obtained. Direct comparisons of mechanical properties were made for a wide range of polymers.

[1] Reneker, D. H.; Yarin, A. L. *Polymer* 2008, 49, (10), 2387-2425.

[2] Naraghi, M.; Chasiotis, I.; Kahn, H.; Wen, Y. K.; Dzenis, Y. *Applied Physics Letters* 2007, 91, (15), 151901.

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