Abstract Submitted
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Electrospun Buckling Coils YU XIN, DARRELL RENEKER, The University of Akron — Electrospinning offers a useful way to produce fibers with micron and nanometer scale diameter. The present work deals with the buckling phenomenon characteristic of a jet impinging upon the surface of collector. A viscous jet may have either tensile or compressive forces along its axis. The periodic buckling that is often observed is attributed to the occurrence of compressive forces as the jet decelerates at the collector. With the increase of axial compressive stresses along the jet, a jet with circular cross sections first buckles by formation of sharp folds, and then by formation of coils. The resulting buckling patterns include zigzag patterns and coils that which can be controlled by changing parameters, such as density, viscosity, conductivity, voltage, polymer concentration, distance and volumetric flow rate. Uniformly buckled polymer fibers can be made at a rate of one turn per microsecond. An experimental apparatus was built to continuously collect buckling coils of nylon 6, from a water surface, into a multilayer sheet. These small "springs" and sheets will be tested for mechanical properties needed in biomedical applications.

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