Fabrication and Characterization of Aligned Fibers on Nonconductive Substrates from a Novel Electrospinning System

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Electrospinning has become a valuable technique for producing micro-to-nanoscale polymeric fibers with length scales from ~1 nm to 100 μm. Alignment of electrospun fibers further expands upon functionality by increasing reproducibility and improving predictive behavior of fibers in various environmental conditions. The utility of electrospun fibers can be subsequently increased with the ability to deposit directly onto a non-conductive/non-energized surface. Possible uses include displays and sensors for commercial or defense applications or in biomedical application for depositing on tissue. In order to accurately deposit electrospun fibers onto a nonconductive surface, we developed a new electrospinning apparatus. The set up for the device includes two grounded electrodes separated with a small gap that sheets of air were be forced through in order to prevent the fibers from contacting the electrodes. Fibers were deposited directly onto a nonconductive surface placed below the grounded electrodes. Details of the apparatus along with images and analysis of resultant fibers will be presented.