Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B

Supplementary Information

Fabrication of 3D Aligned Nanofibrous Tubes by Direct Electrospinning

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Supplementary Results and Discussion

Due to the force generated by electrostatic field between the spinneret and electrodes (Figure S3), the charged fibers move towards the electrodes and the direction of the force is similar to the direction of electric field. In the gap area between the two electrodes, electric field force (F_E) is not exactly perpendicular to the plane of the electrodes (Figure S3b) and the horizontal component of the force (F_{EH}) is responsible for the alignment of the incoming fiber (Figure S3a). F_{EH} pulls the fibers towards the electrodes leading to their alignment while F_{EV} pulls the fiber towards the electrode gap. Moreover, the F_{EV} component decreases towards the center of the gap (Figure S3b). Figure S3b shows the distribution of F_{EV} across the gap and over the electrodes. On the other hand, the repulsive force from a deposited fiber across the gap towards an incoming fiber (F_R) is almost uniform considering the uniform charge density on the surface of the deposited fiber. Figure S3c shows the distribution of F_R across the gap.

Supplementary Figures

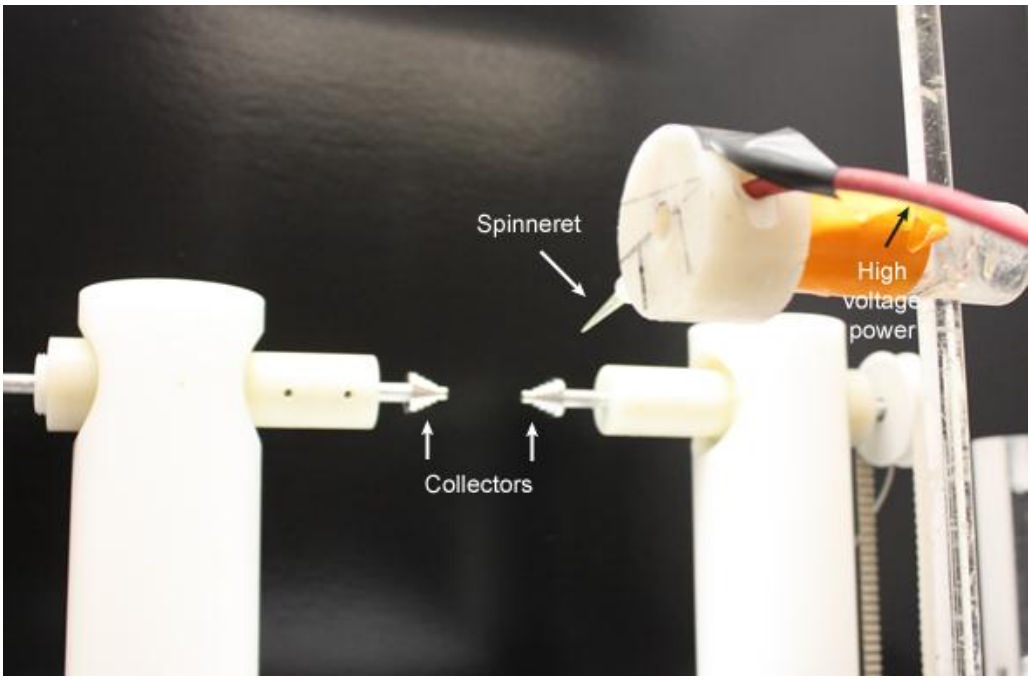

Figure S1. Photograph of electrospinning system with spinneret system.

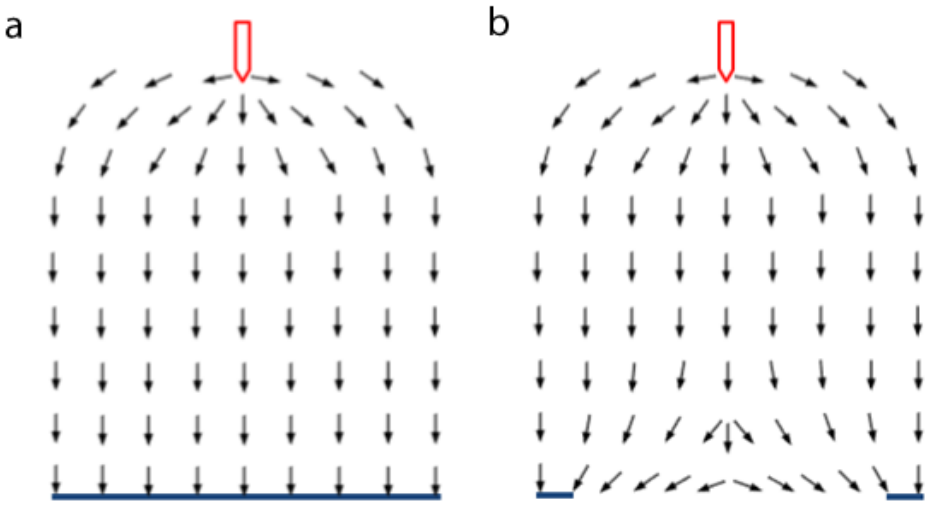

Figure S2. Electric field lines. (a) In a spinneret (red) and electrode (blue) setup and (b) In a spinneret and electrodes with a gap setup.

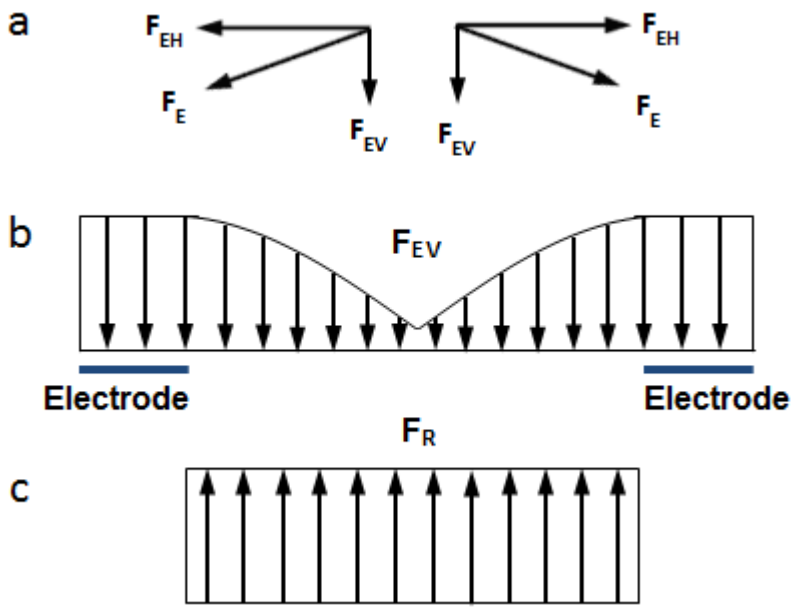

Figure S3. Acting forces in shaping the nanofibers (with the arrangement of nozzle and collector shown in figure 1). (a) Two mutually perpendicular components of electric field force F_E. (b) Distribution of F_{EV} across the gap and over the electrodes. (c) Distribution of repulsive force F_R between two nanofibers in the gap area.