Control of Electrospun Jets Instabilities: In Pursuit of Perfect Continuous Nanofiber Alignment

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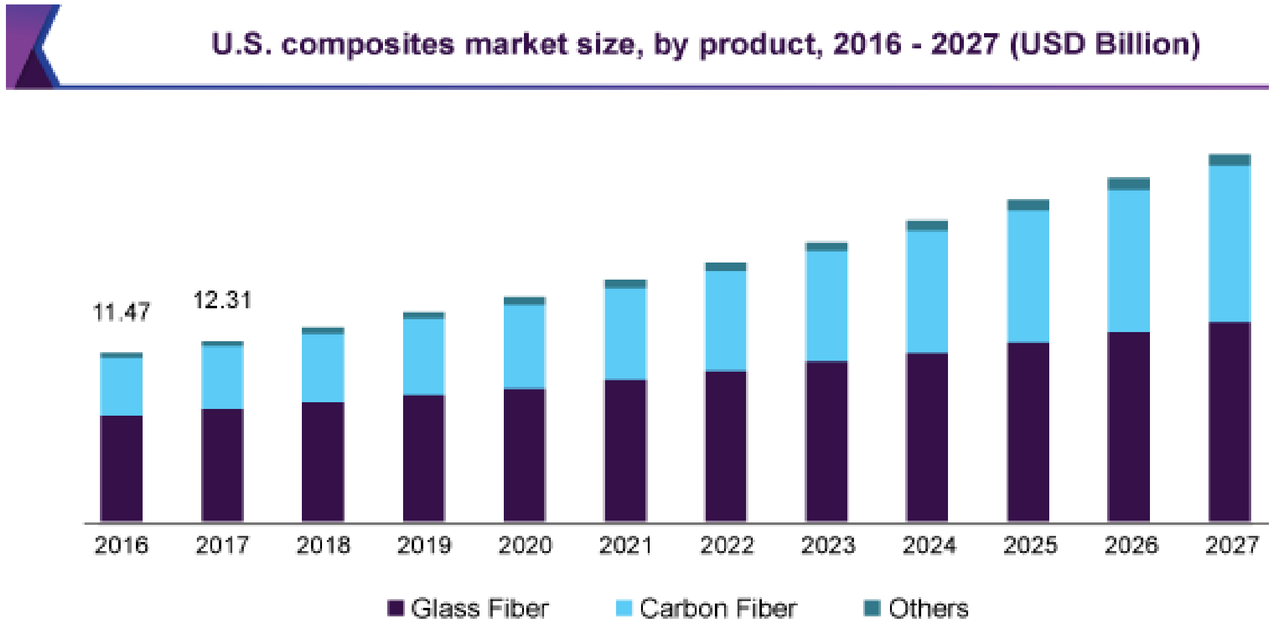
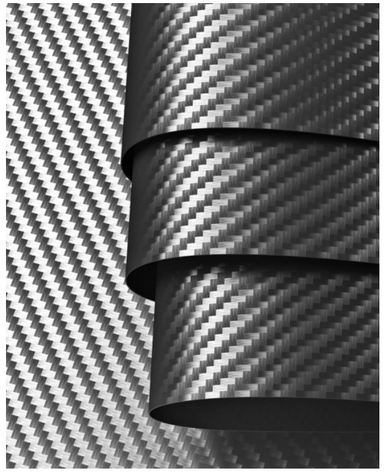
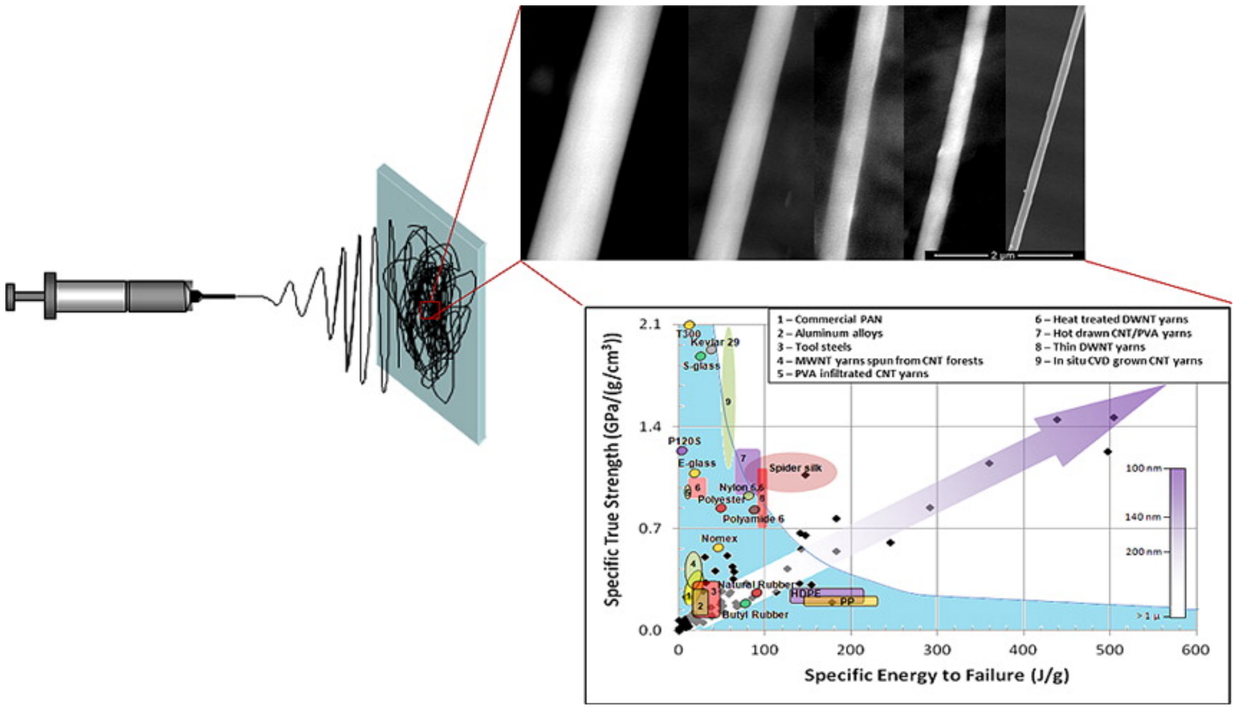


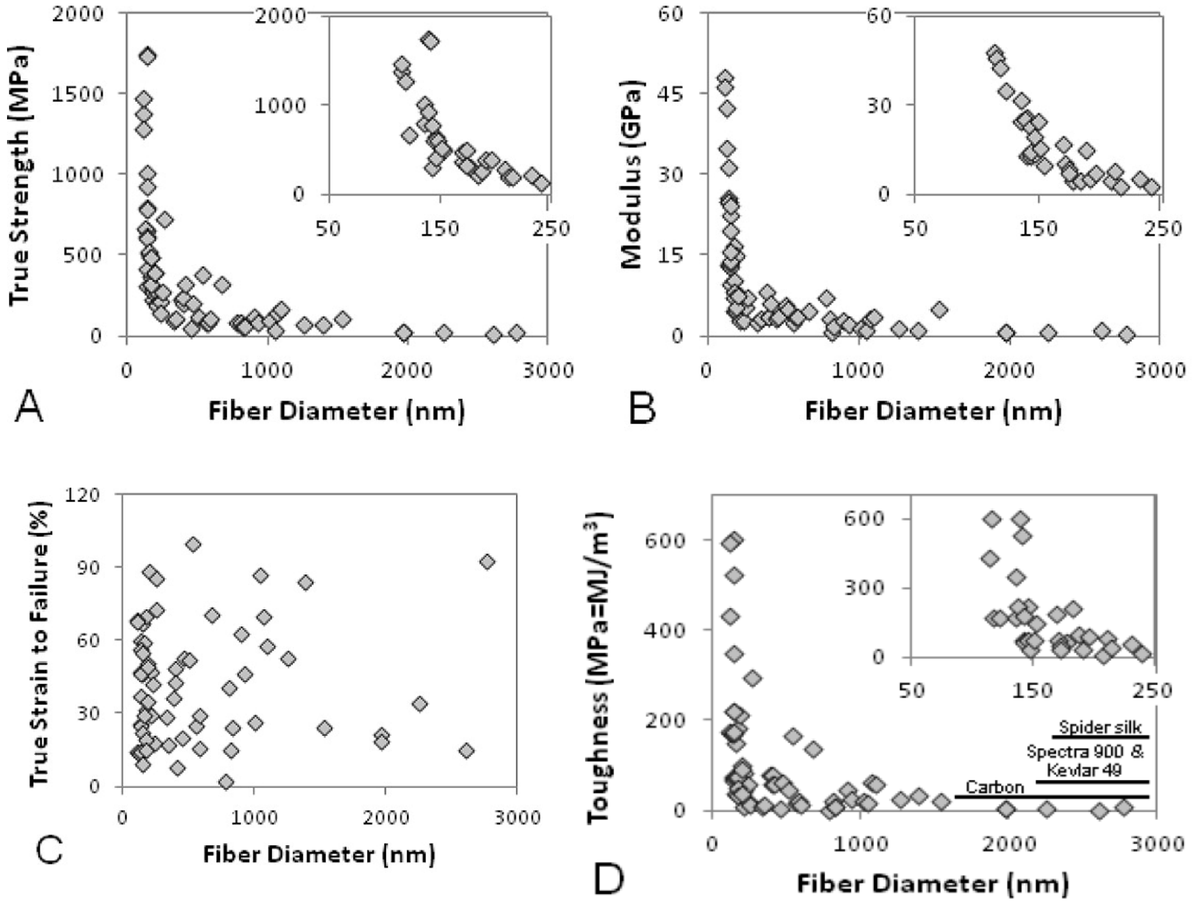
Source: www.grandviewresearch.com



Demonstrated Size Effects in Mechanical Properties of Fibers

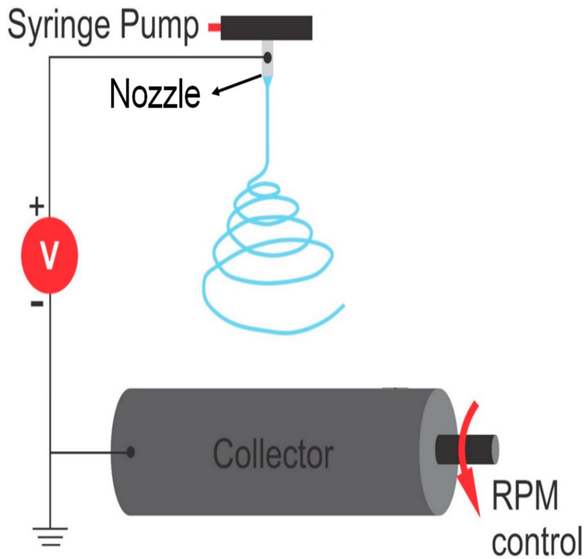


Papkov D, Zou Y, Andalib MN, et al. (2013) Simultaneously Strong and Tough Ultrafine Continuous Nanofibers. ACS Nano 7:3324–3331.

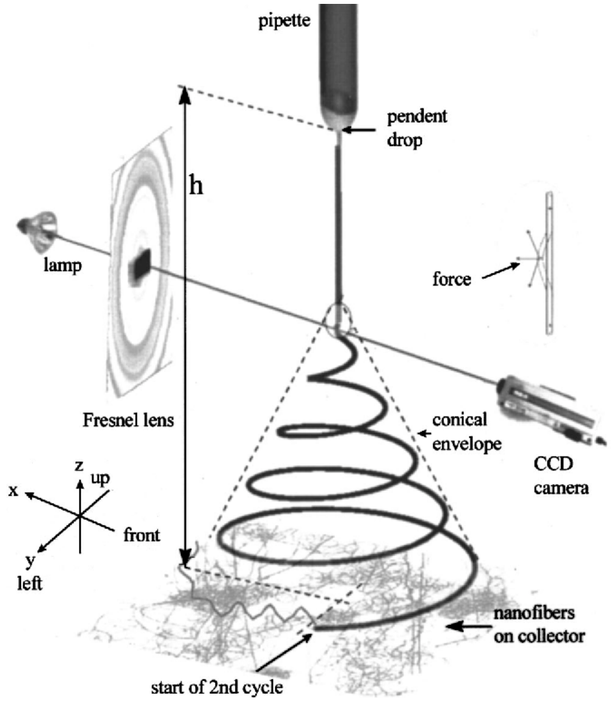


Size effects in mechanical properties and structure of as-spun PAN nanofibers. (A) True strength; (B) modulus; (C) true strain to failure; (D) toughness

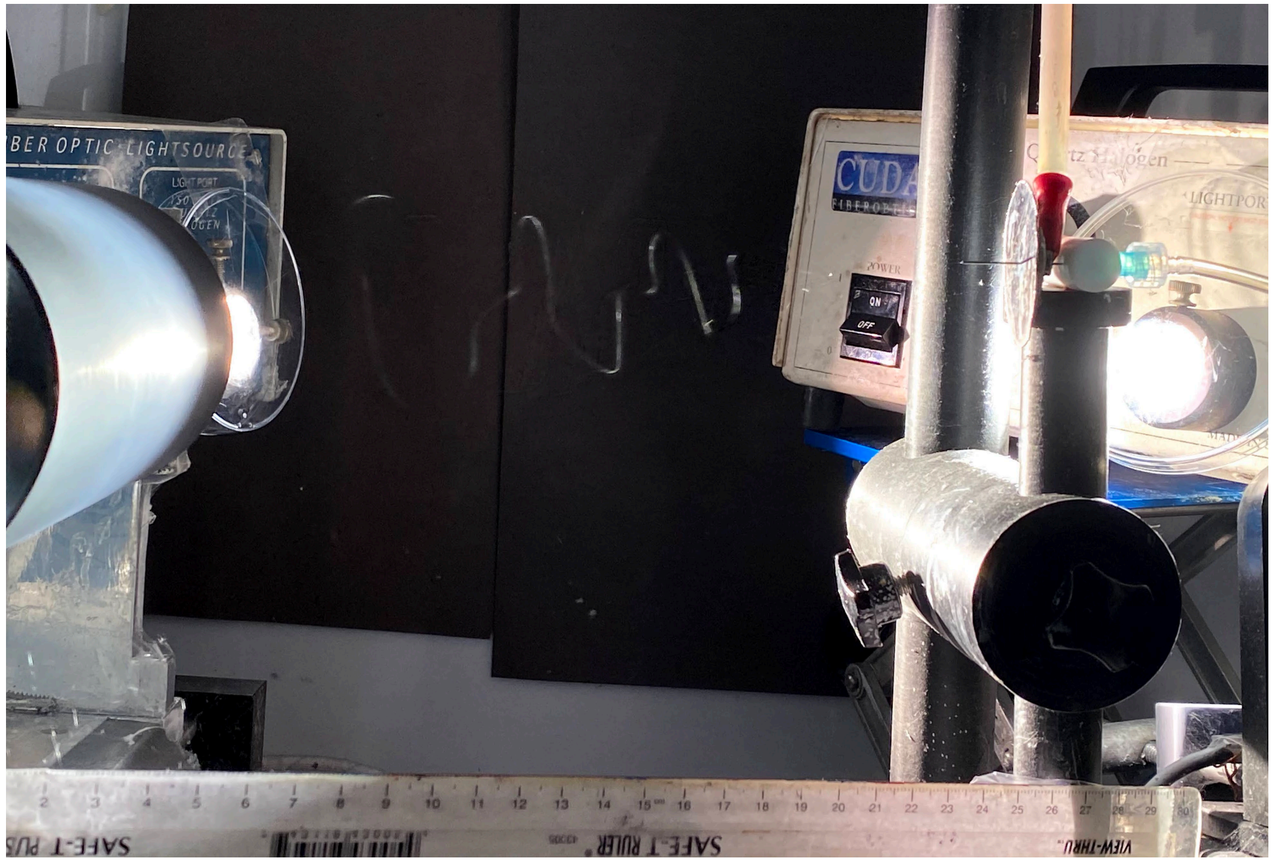
Electrospinning Process



Electrospinning set up diagramed.

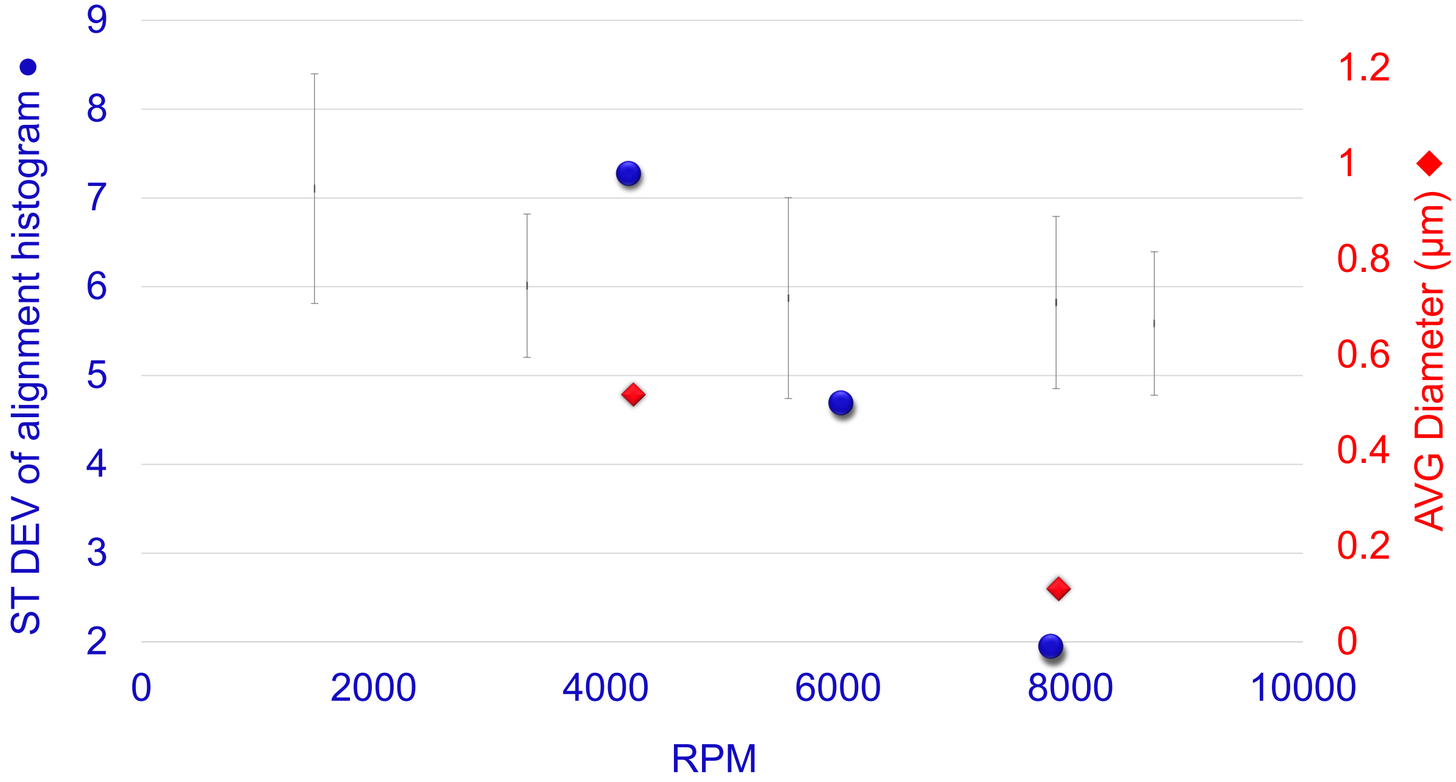


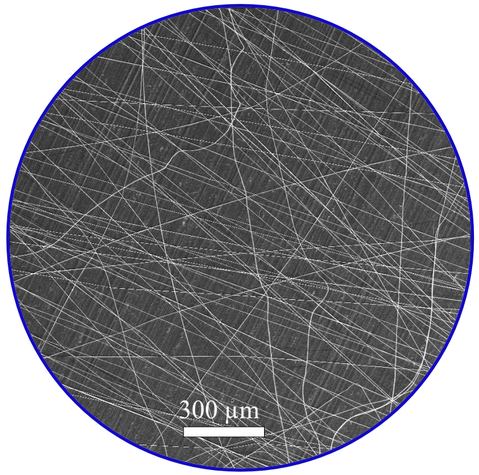
Bending instability of electrically charged liquid jets of polymer solutions in electrospinning, Darrell H. Reneker, Alexander Yarin, H. P. Fong, Sureeporn Koombhongse, 2000.



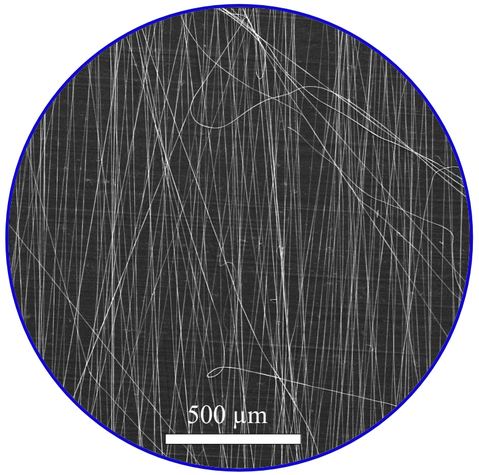
Electrospinning experimental set up

RPM effects on fibers alignment

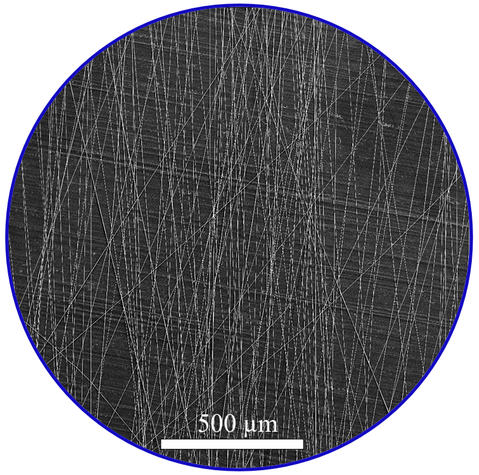




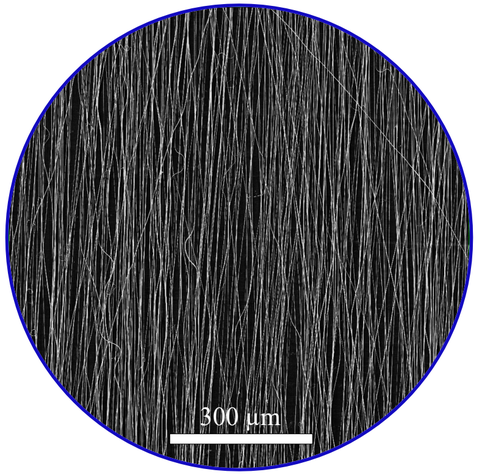
1490 RPM



3320 RPM

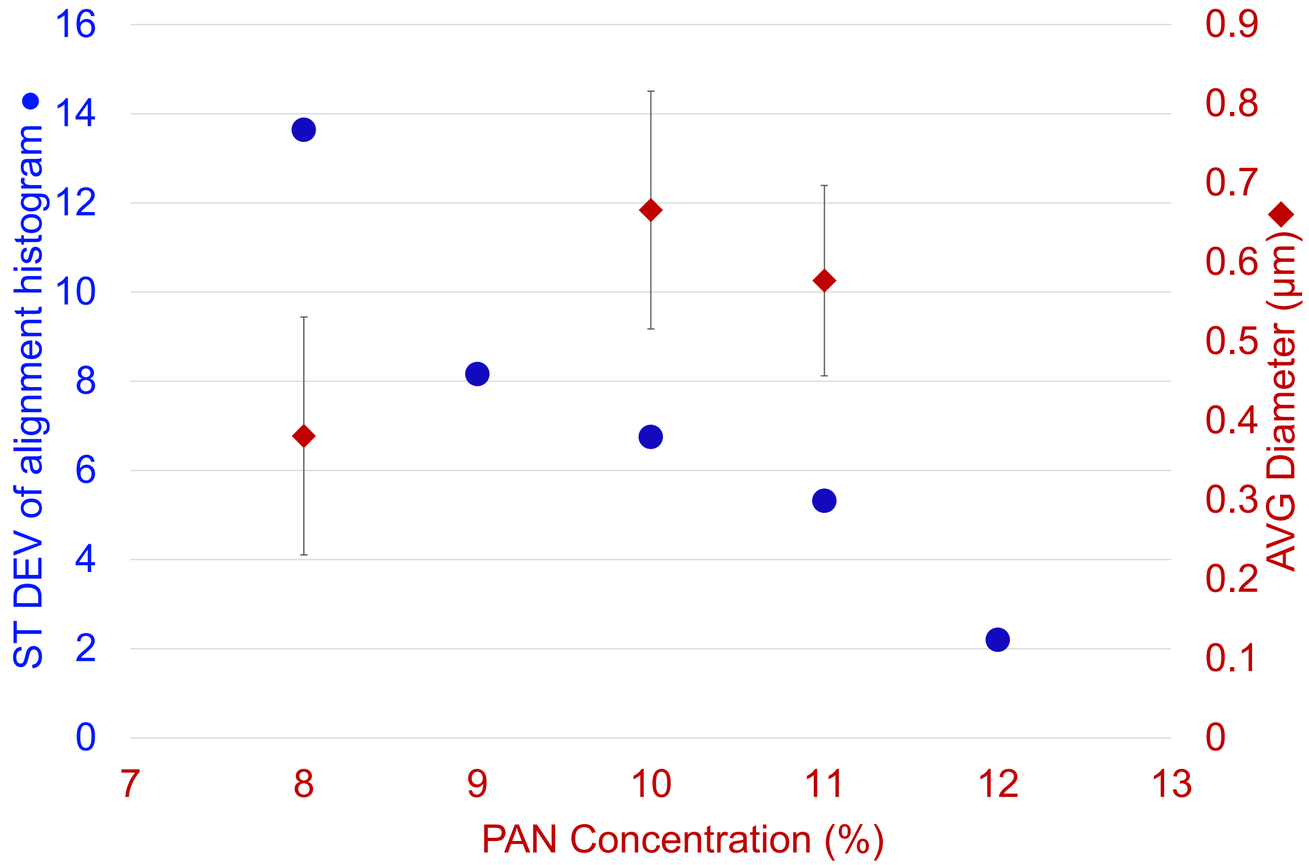


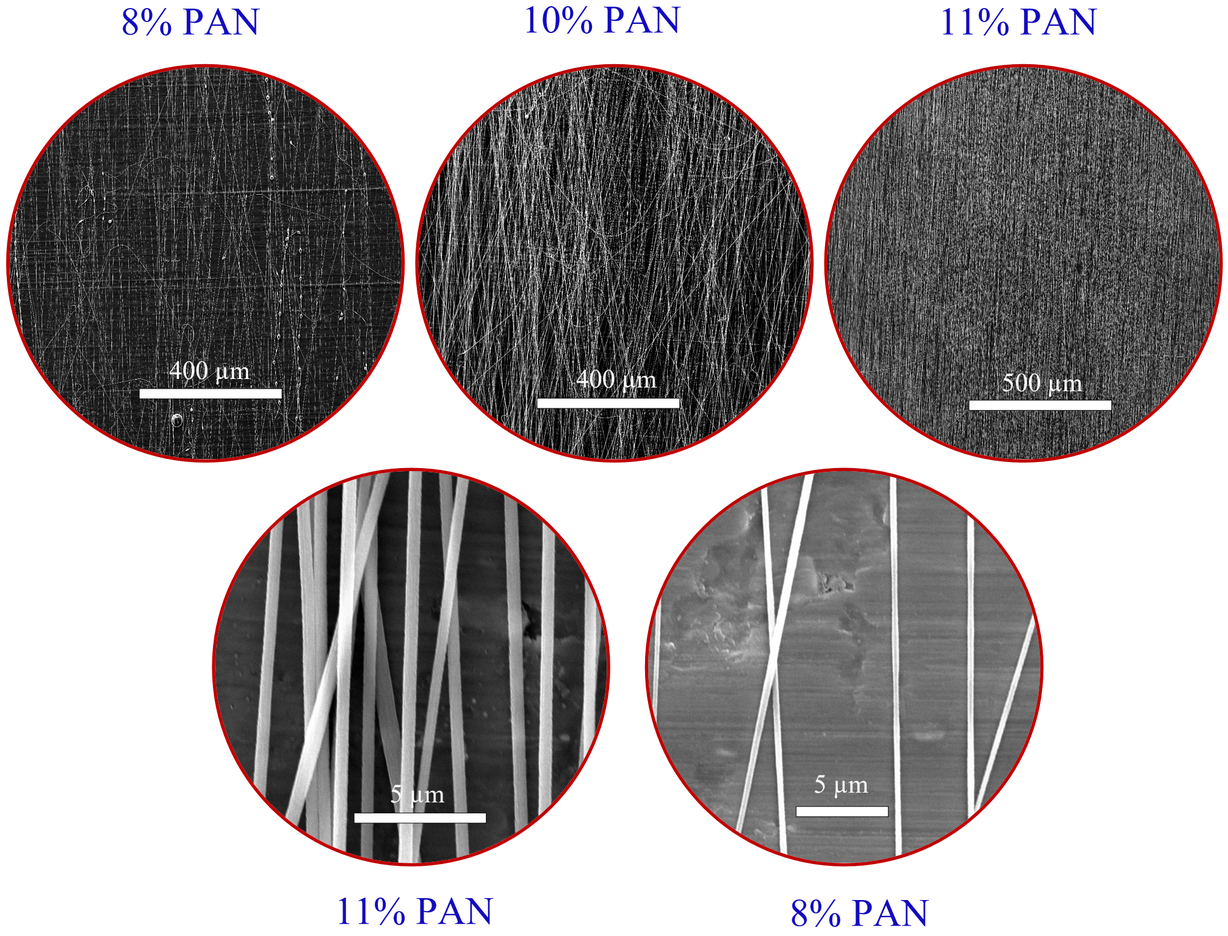
6780 RPM



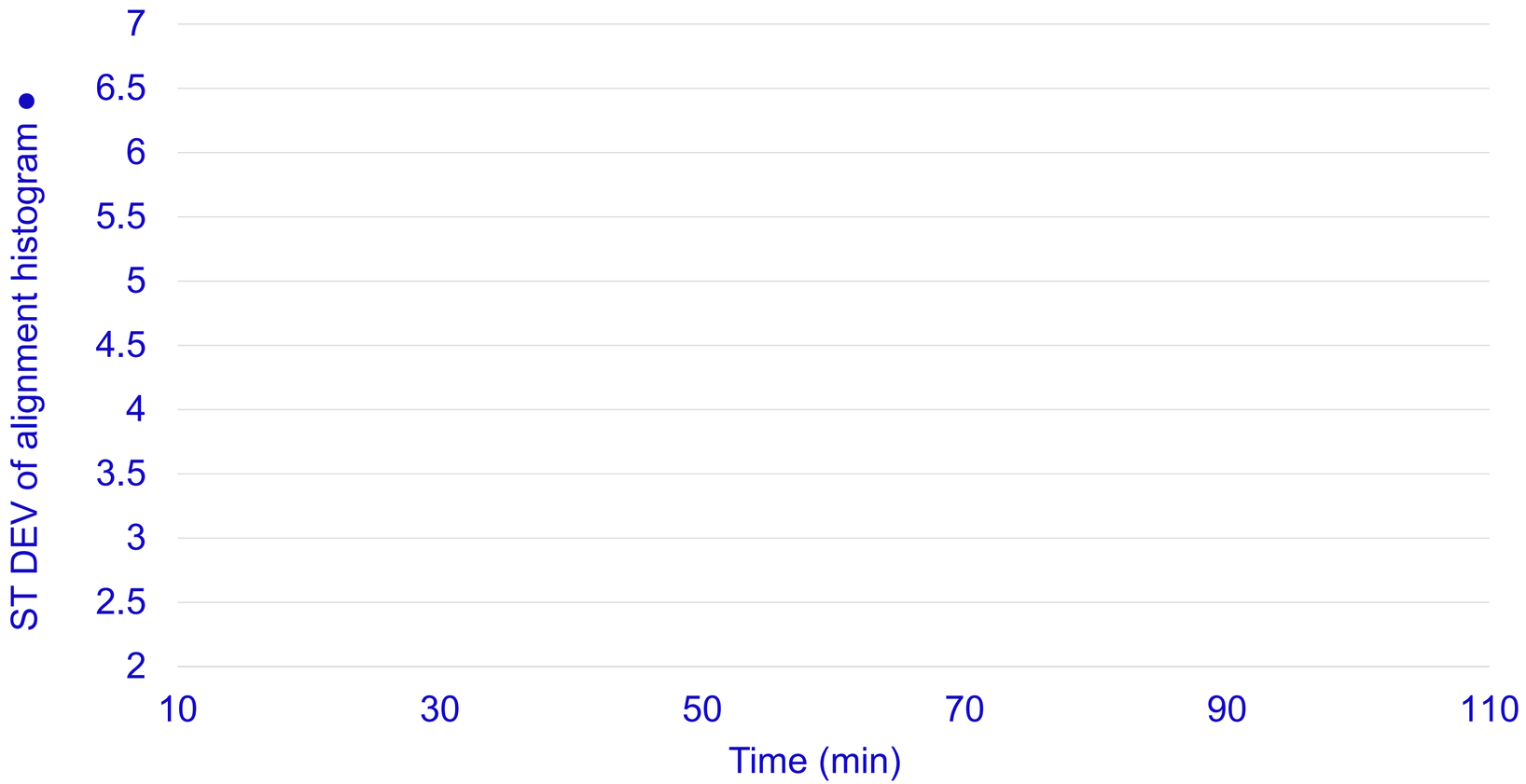
8720 RPM

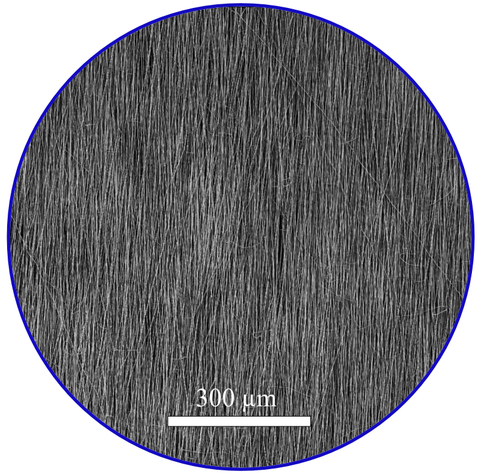
Polyacrylonitrile (PAN) effects on fibers alignment



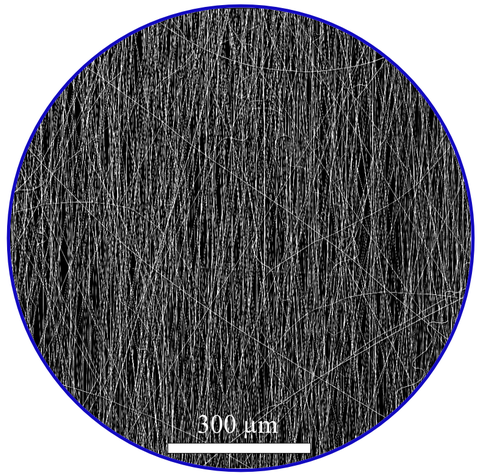


Spinning duration effects on fibers alignment



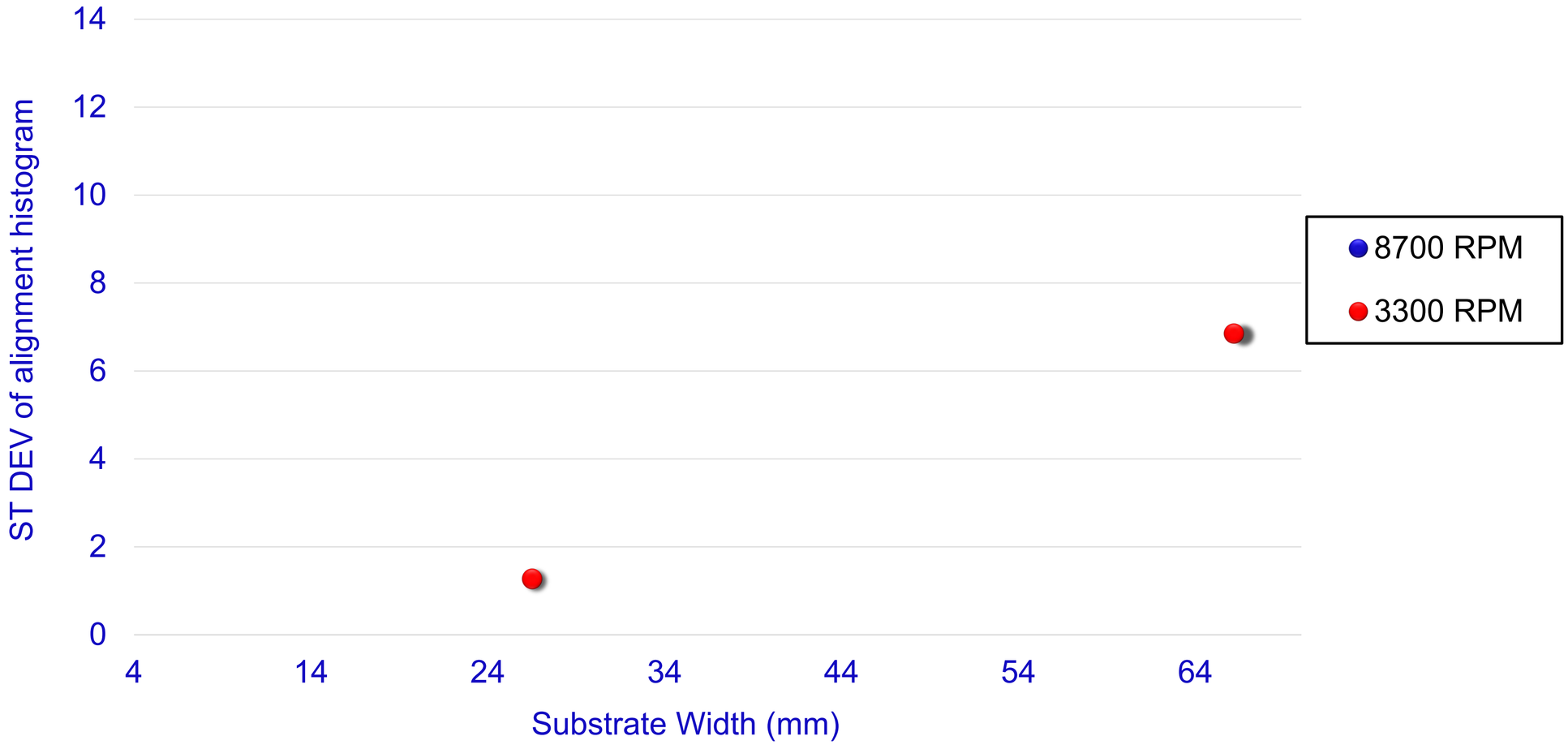


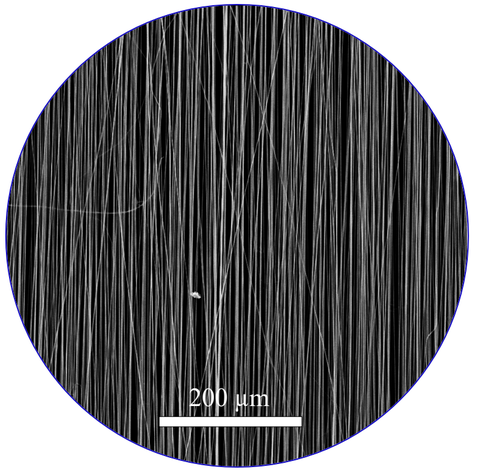
30 Min



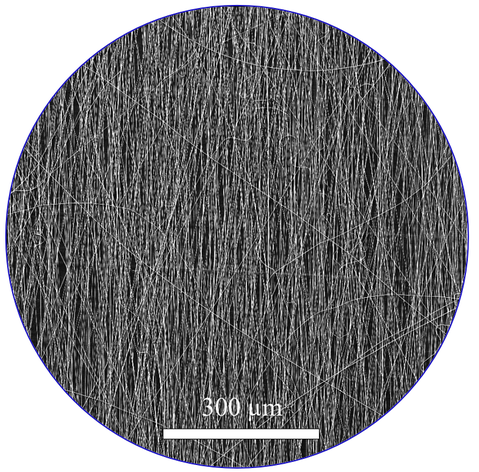
105 Min

Substrate width effects on fibers alignment



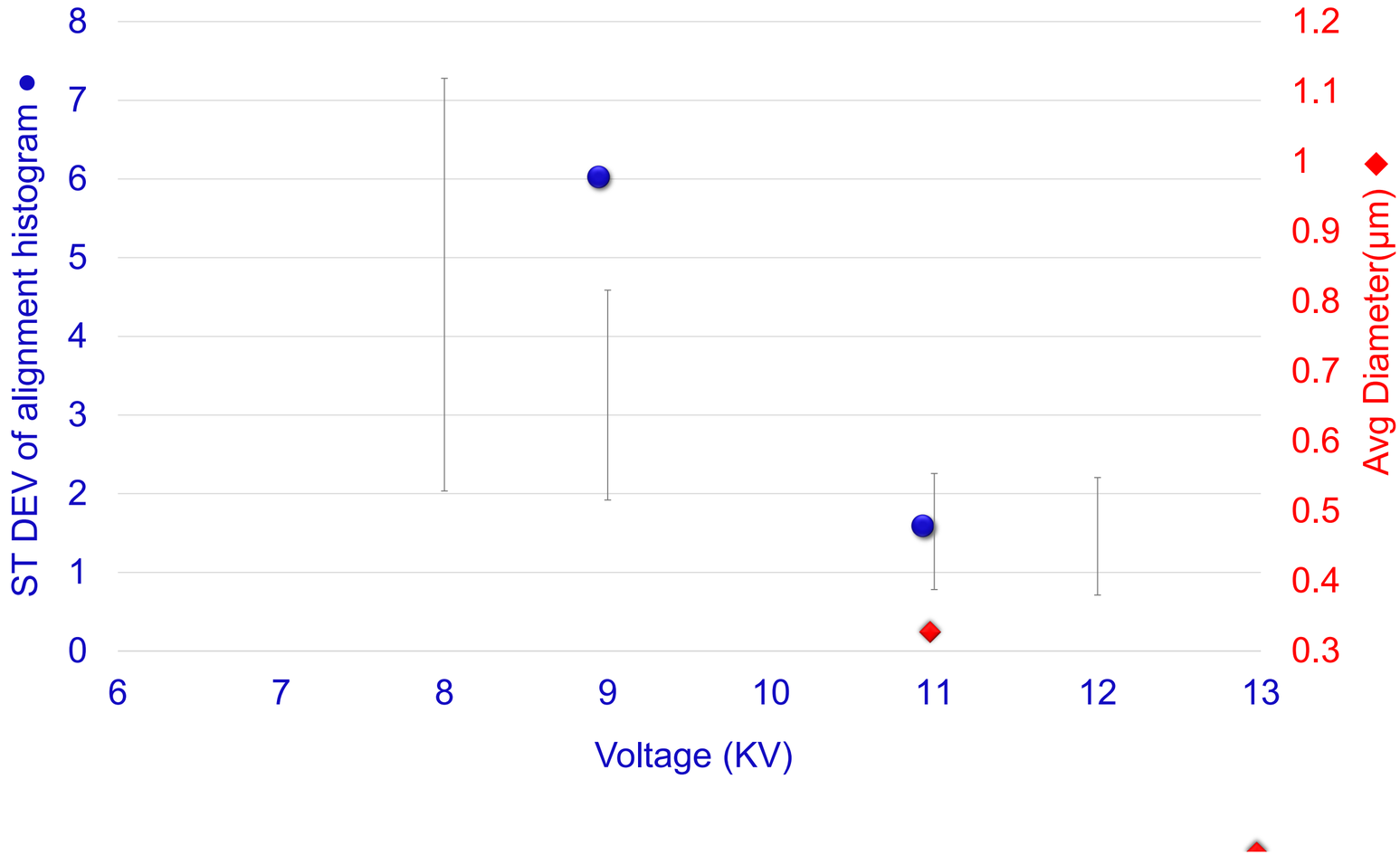


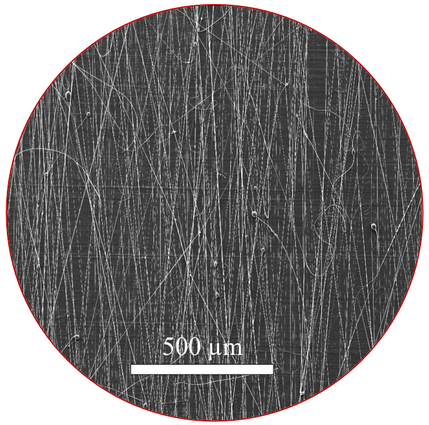
4 mm



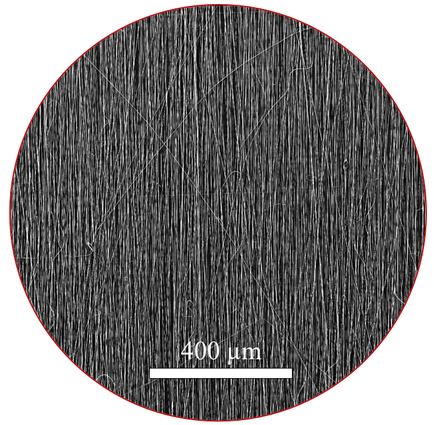
60 mm

Voltage effects on fibers alignment

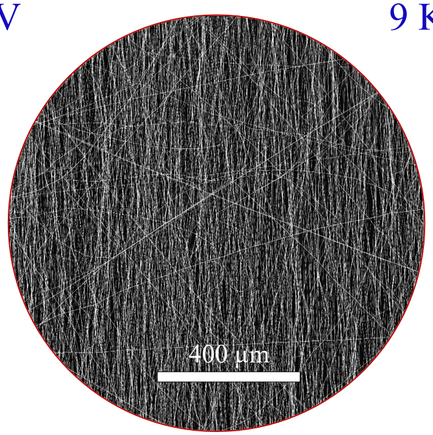




8 KV



9 KV



12 KV

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