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A Review on Nano-Fiber Fabrication Methods by Near-Field Electrospinning

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Abstract

Faculty: Nanotechnology

School of Engineering and Sciences

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keywords: nanotechnology, nano-fiber, near-field electrospinning, NFES

1 Summary

TABLE 1.1: Electrospun Polymer Solutions - Solution and Process Parameters

Polymer	Solvent	NFES Variant	Polymer Solution and Process Properties	Fiber Characterization	Reference
polyethylene oxide (PEO) (Dow Inc.: WSR- 301)	Deionized water	low-voltage and low-electrical field NFES	• Concentration: 1, 2, and 3 PEO wt % • rise in solution conductivity with the increase in PEO concentration • Solution Stirring: 24 h of free diffusion followed by 96 h of stirring mixing at 30 rpm • 3 mL syringe • 27 gauge type 304 stainless steel needle • solution deposition rate lower than 1 $\mu L/h$ • needle-to-collector distance: 1 mm • The voltage turned when the polymer formed a full-sized droplet of 500 μm diameter at the needle tip.	•	[1]

TABLE 1.2: Electrospun Polymer Solutions - Solution and Process Parameters

Polymer	Solvent	NFES Variant	Polymer Solution and Process Properties	Fiber Characterization	Reference
			• NFES process initiated by an air interference with a glass microprobe tip (1 to 3 μm tip diameter) to overcome the surface tension • Time to produce a stable continuous jet: 45 min		[1]

TABLE 1.3: Electrospun Polymer Solutions - Solution and Process Parameters

Polymer	Solvent	NFES variant	Polymer Solution Properties	Process Properties	Reference
					[1]
					[2]
					[3]
					[4]
					[5]
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