Supporting Information

Nanoscale Morphology, Dimensional Control and Electrical Properties of Oligoanilines

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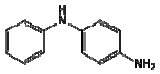
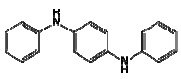
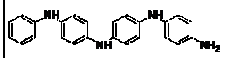
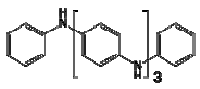
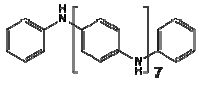
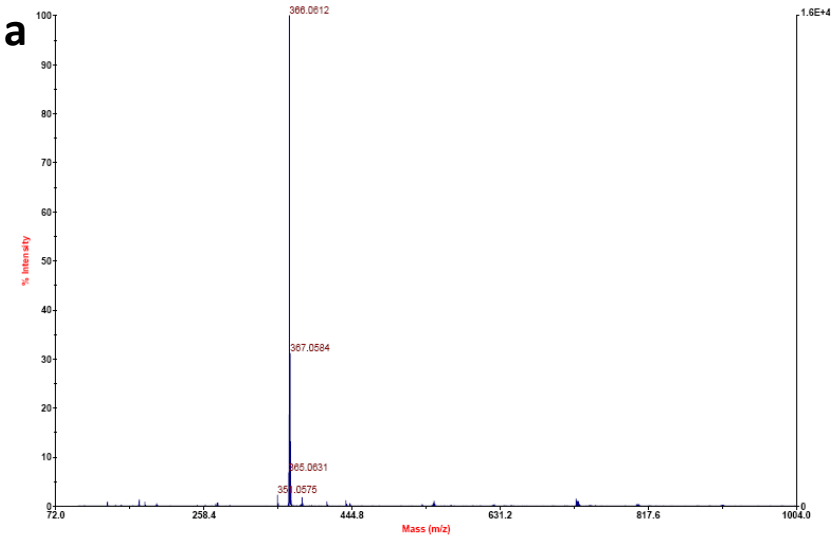
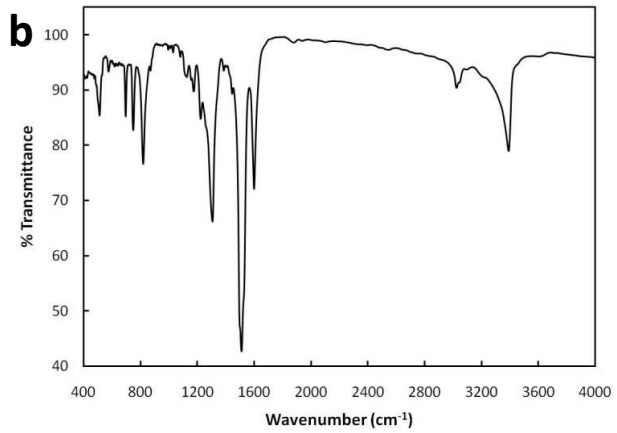
Table S1. Common Abbreviations and Molecular Structures for Aniline Oligomers and Detailed Conditions for Their Nanostructure Formation.

Oligomer	Common abbreviation	Molecular structure	Conditions for nanostructure formation				
			Oligomer	Aqueous solvent	Organic solvent	Process duration	Final morphology
Aniline dimer (*N*-phenyl-1,4-phenylenediamine)			2 mg	4 mL 0.1 M $HCl_{(aq.)}$	1 mL ethanol	10 days	Nanofibers/ nanowires
Phenyl-capped aniline dimer (*N*,*N*'-diphenyl-1,4-phenylenediamine)			2 mg	4 mL 1 M $HCl_{(aq.)}$	1 mL methanol	15 days	Nanowires/ nanoplates
Aniline tetramer	Ph/NH_2 TANI		2 mg	4 mL 0.1 M $HCl_{(aq.)}$	1 mL ethanol	4 days	Nanowires
			2 mg	4 mL 1 M $HNO_{3\ (aq.)}$	1 mL ethanol	4 days	Nanoribbons
			2 mg	4 mL 0.5 M $HClO_4$ (aq.)	1 mL ethanol	4 days	Nanoplates
			2 mg	4 mL 1 M $H_2SO_{4\ (aq.)}$	1 mL ethanol	4 days	Nanoflowers
			2 mg	4 mL 1 M CSA $_{(aq.)}$	1 mL ethanol	4 days	Inter-connected nanofibers
Phenyl-capped aniline tetramer	Ph/Ph TANI		2 mg	4 mL 0.1 M $HCl_{(aq.)}$	1 mL ethanol	5 days	Nanowires/ nanoribbons
Phenyl-capped aniline octamer	Ph/Ph OANI		2 mg	4 mL 0.1 M $HCl_{(aq.)}$	1 mL ethanol	4 days	Agglomerates





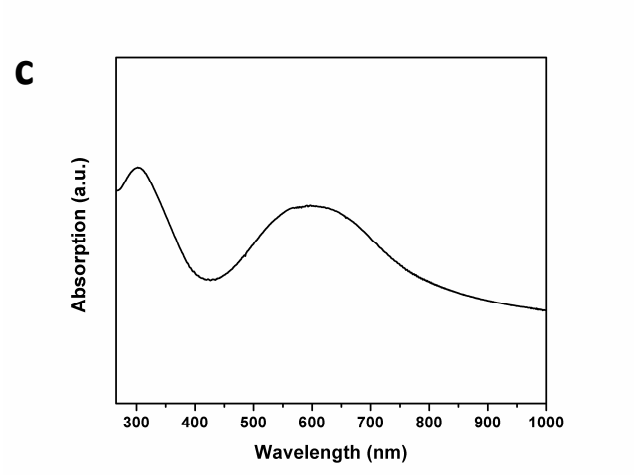


Figure S1. (a) MALDI, (b) FT-IR, and (c) UV-vis spectra of tetraaniline in its emeraldine base oxidation state. The UV-vis spectrum for tetraaniline is presented in the main text (Fig. 1c).

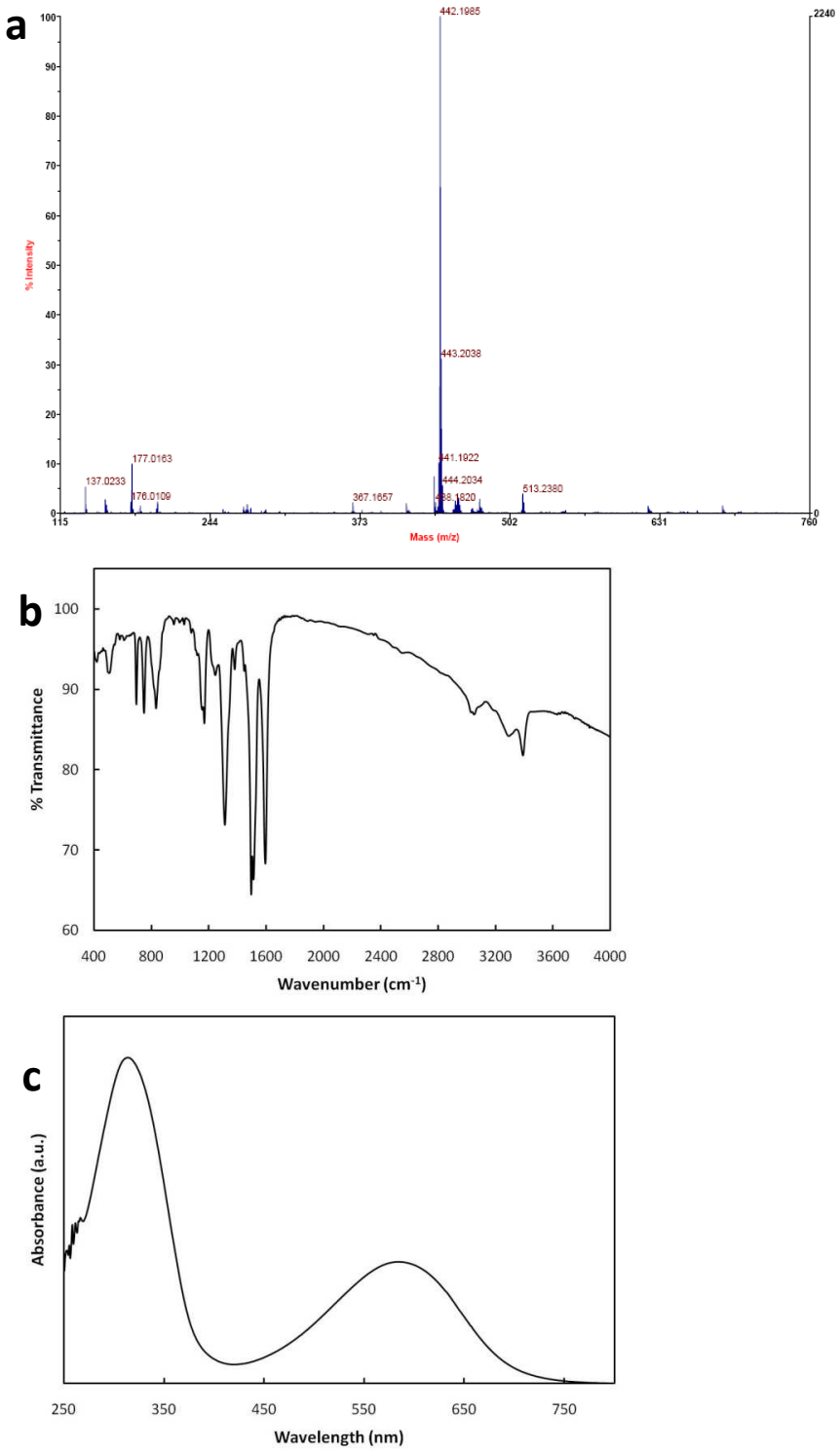


Figure S2. (a) MALDI, (b) FT-IR, and (c) UV-vis spectra of phenyl-capped tetraaniline in its emeraldine base oxidation state. The UV-vis spectrum was taken in ethanol.

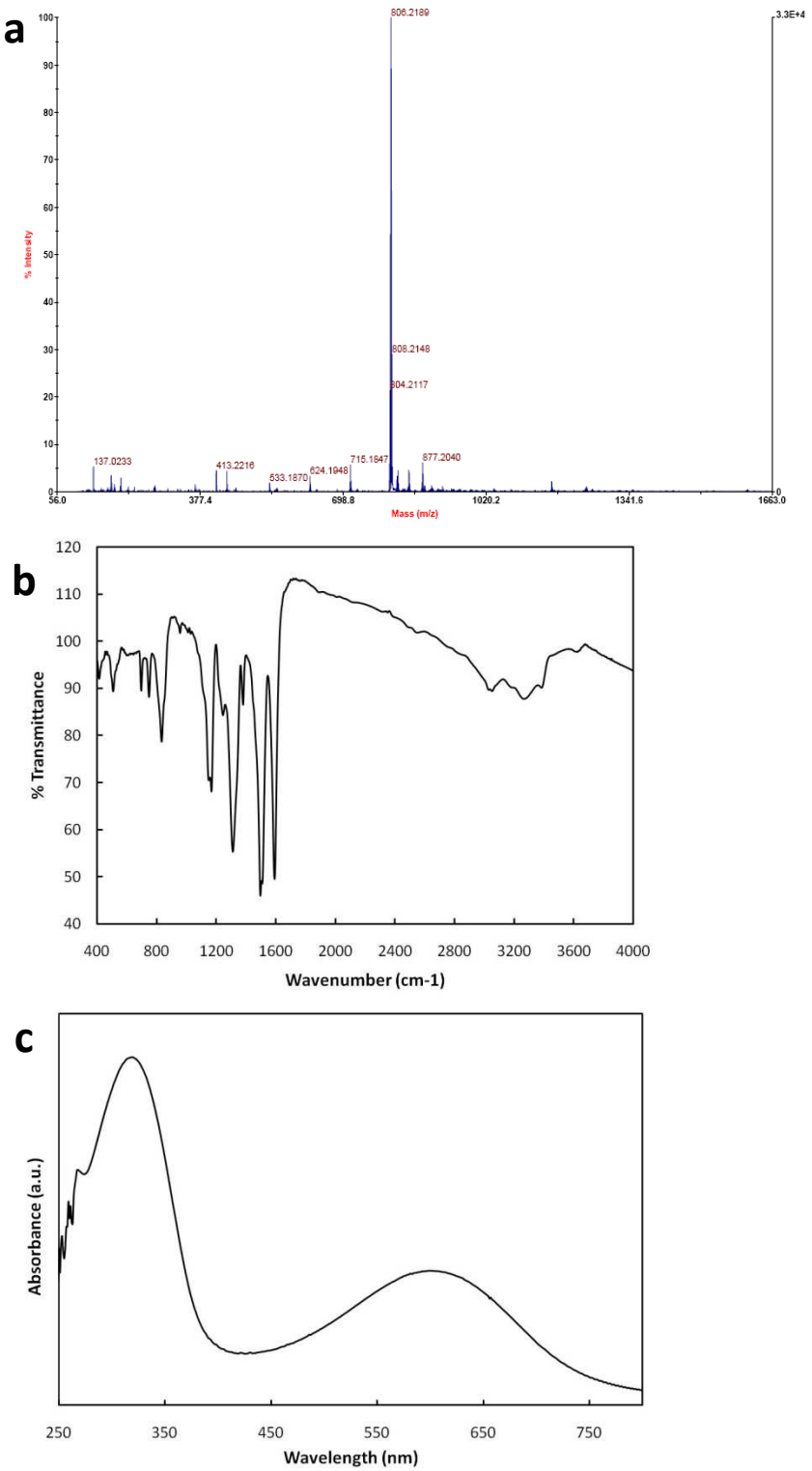


Figure S3. (a) MALDI, (b) FT-IR, and (c) UV-vis spectra of phenyl-capped octaaniline in its emeraldine base oxidation state. The UV-vis spectrum was taken in dimethylformamide (DMF).

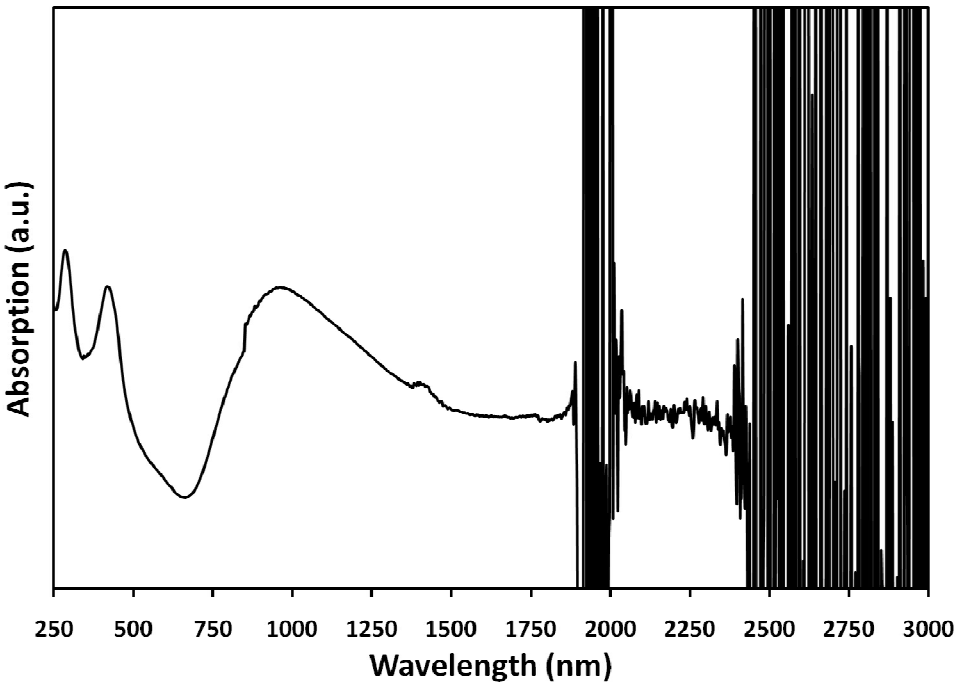


Figure S4. UV-vis-NIR spectrum of tetraaniline nanowires dispersed in water. The spectrum saturates beyond 1800 nm due to water absorption.

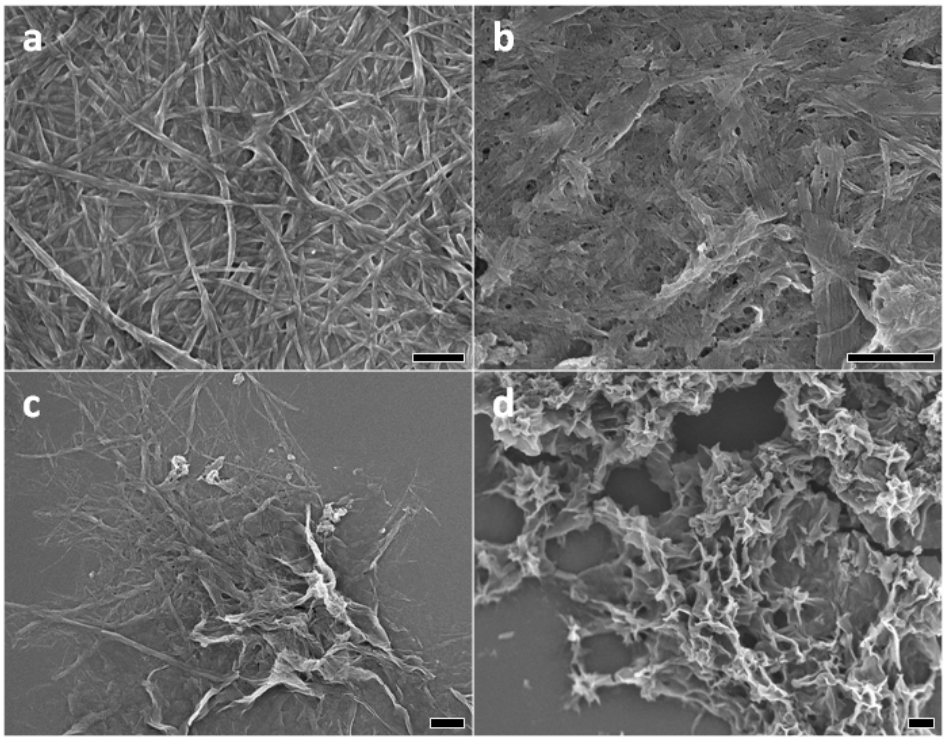


Figure S5. SEM images of tetraaniline that has undergone the same self-assembly process in (a) 0.1 M HCl, (b) 1.0 M HNO_3, (c) 0.5 M $HClO_4$, and (d) 1.0 M H_2SO_4 in the absence of any organic solvent. Only poorly defined and interconnected structures are obtained, illustrating the importance of the solvation factor attributed to ethanol in our process.

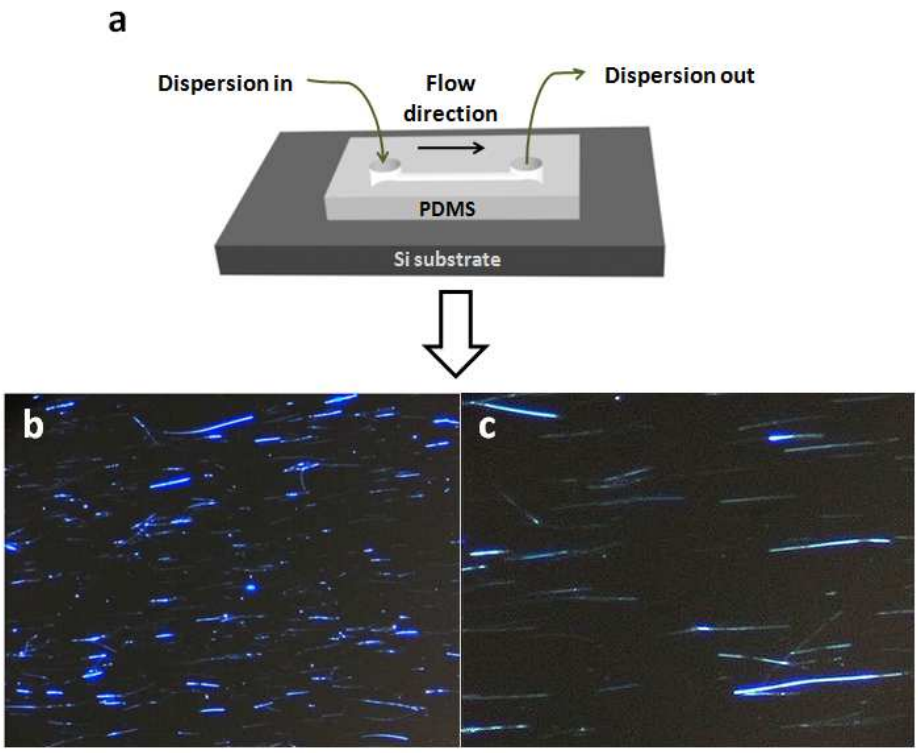


Figure S6. Schematic illustration of the microfluidic flow channel structure used to produce aligned nanofibers. (a) A thin rectangular cavity was cut into one side of a PDMS stamp. This created a channel when the stamp was brought into contact with a flat piece of a Si wafer. A dispersion of tetraaniline nanowires in an ethanol/water solvent mixture was then passed through the channel. (b) A dark field optical micrograph shows that the tetraaniline nanowires are aligned on the substrate under the flow channel. (c) A dark field optical micrograph shows a closer view of a selected area from (b).