Supporting Information

Liquid Crystalline Peptide Nanowires**

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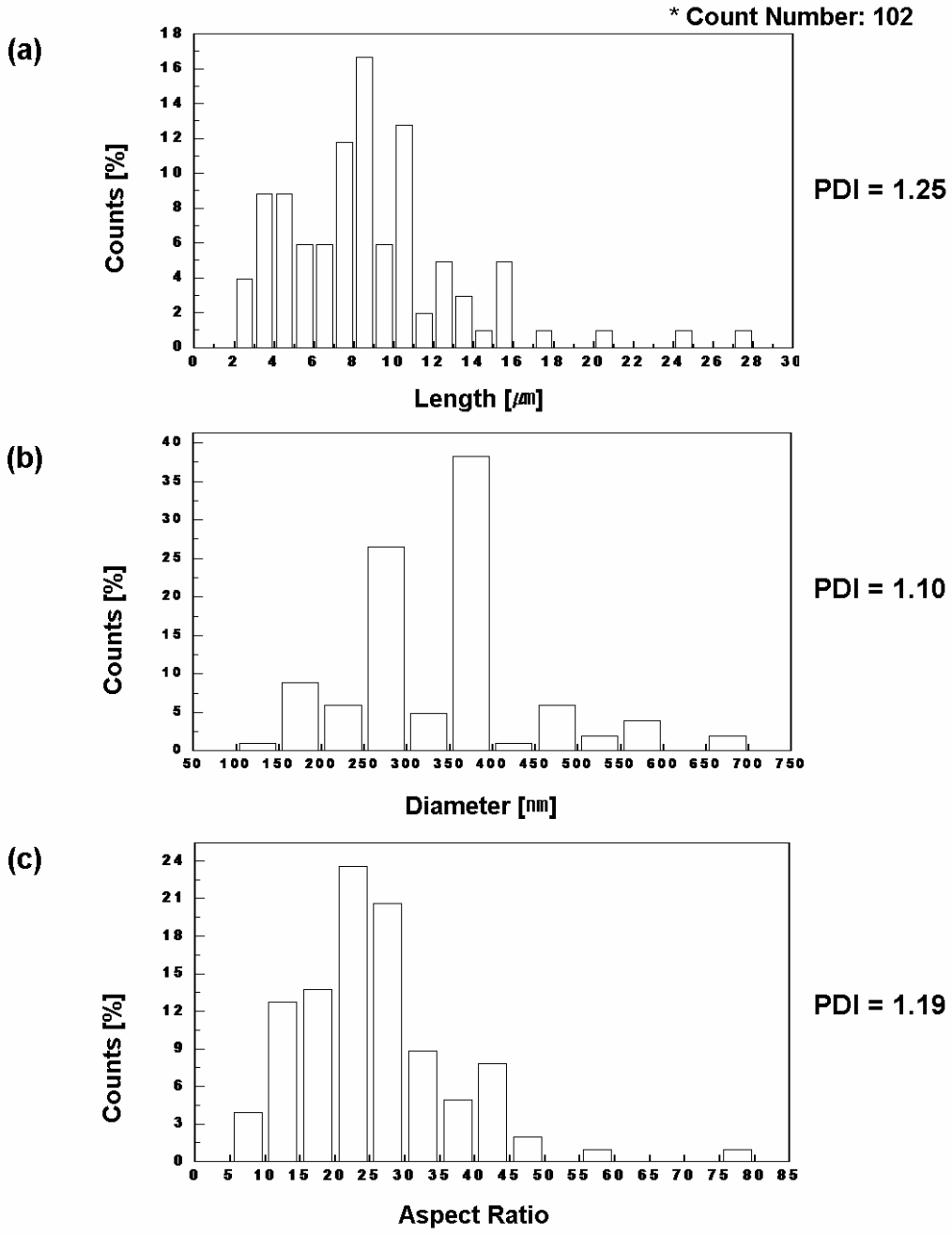


Figure S1. Size distribution of as-synthesized peptide nanowires. Length (a), diameter (b) and aspect ratio (c) of peptide nanowires were taken from the SEM images of a dried dispersion. Polydispersity (PDI) values were calculated from comparison of number/weight average values.

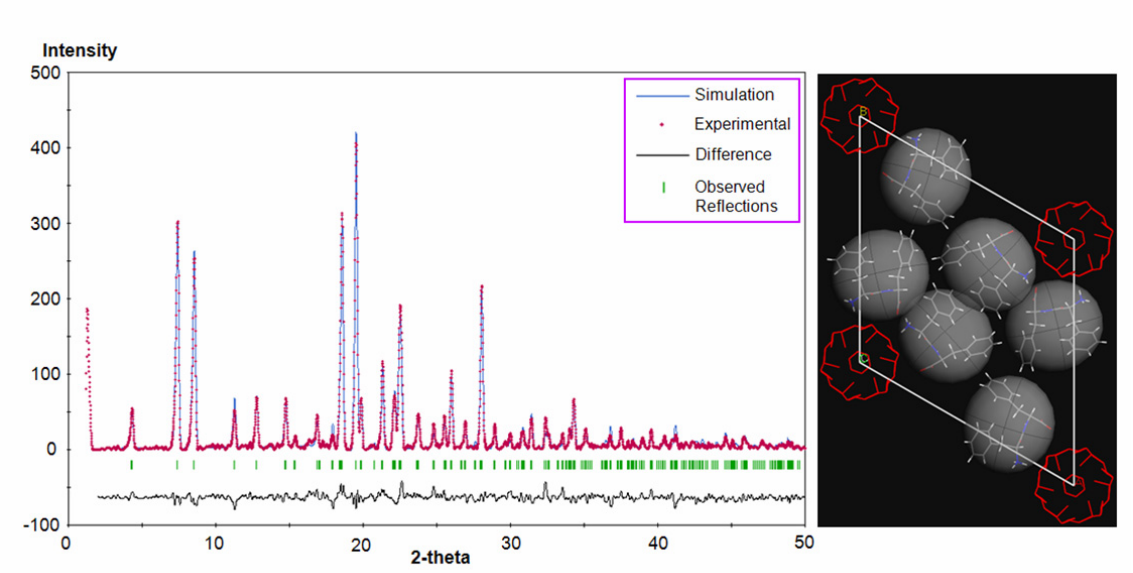
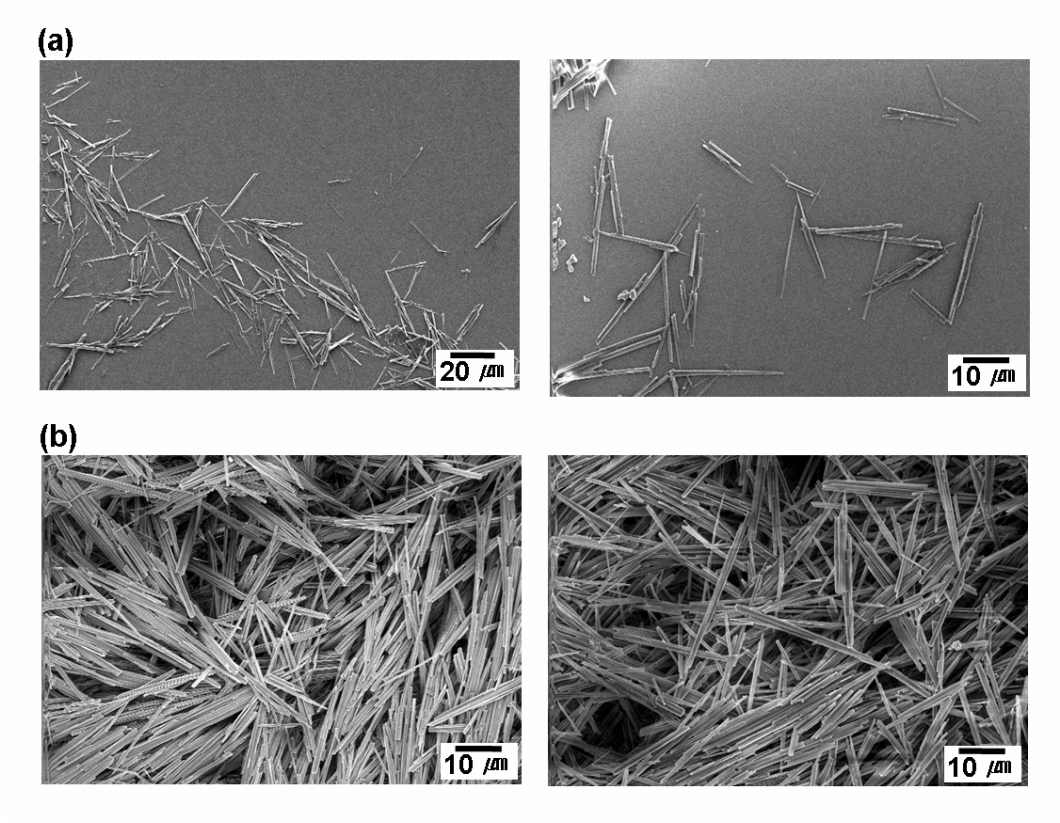


Figure S2. Comparison of powder diffraction pattern calculated from the structure solution after Rietveld refinement (blue) overlaid with the experimental pattern (magenta). The difference plot (black) is plotted below the overlaid patterns and observed reflections (green) are shown as well. Pawley refinement was applied to optimize the pattern parameters, in which pseudo-Voigt function was used to fit the peak profiles. The Berar-Baldinozzi function was selected to consider asymmetry correction to whole diffraction peaks. The final Pawley refinement showed a R_{WP} value of 5.16 %. In Rietveld refinement the lattice and pattern parameters were optimized by introducing motion groups and the preferred orientation effect was also considered by using the March-Dollase function. The global isotropic temperature factor was used and the final R_{WP} value was 9.37 %. The $P6_1$ unit cell structure and motion groups (grey balls) optimized by Rietveld refinement are represented in the right-hand side of the overlaid plot. All possible translational and torsional changes could be made by defined motion groups including hydrogen atoms in the Rietveld refinement.



(c)

		Avg. length [um]	Avg. diameter [nm]	Avg. aspect ratio
Before phase-separation		8.60	346.09	25.11
After phase-separation	Isotropic	5.00	370.09	13.74
	Nematic	9.74	371.43	26.21

Figure S3. SEM images of peptide nanowires for the dried samples of the (a) isotropic and (b) nematic phases (dispersion with 0.4 wt% of peptide naowires). Longer peptide nanowires were dominant in the nematic phases and the shorter wires were fractionated into the isotropic phases. (c) Comparison of average length, diameter and aspect ratio of peptide nanowires from each phase. The nanowires in nematic phase were twice as long as those in isotropic phase on average.

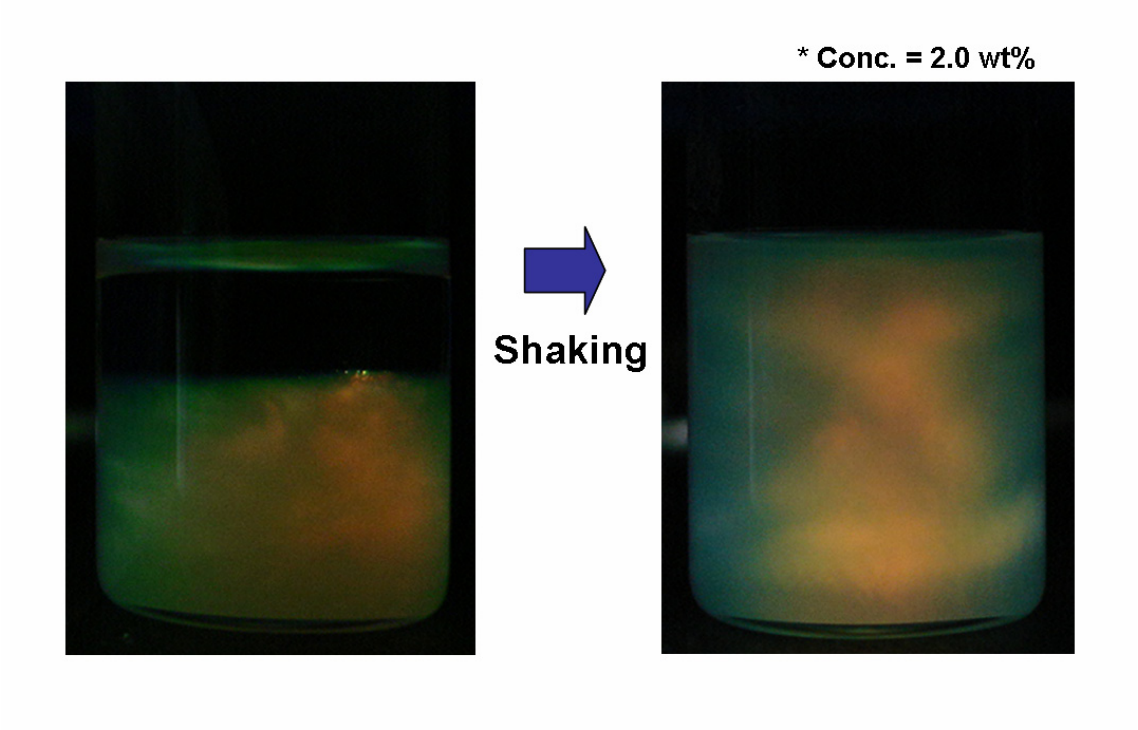


Figure S4. Shear induced alignment of peptide nanowires in a liquid crystalline dispersion. Upon shaking a vial, the phase coexistence was broken because of fluidity of nematic solution. The birefringence spread out through whole dispersion due to shear induced alignment of peptide nanowires.