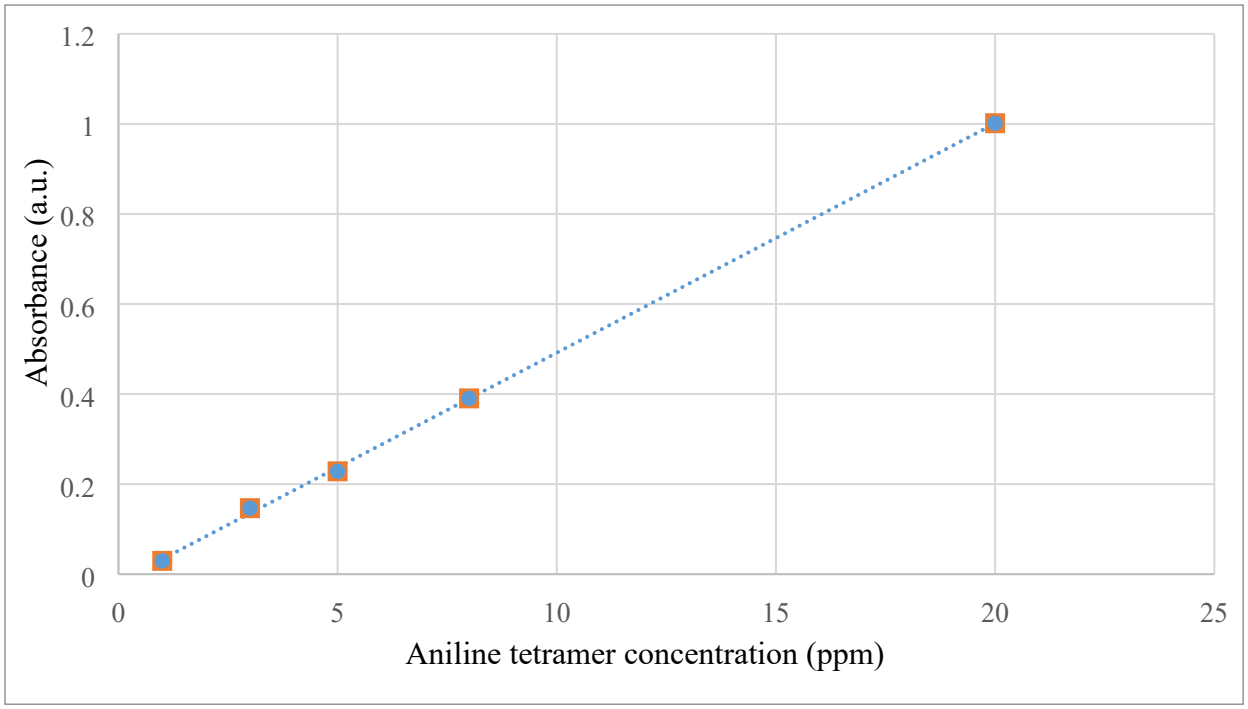

Equation of line: $y = 0.0509x - 0.0177$ ($R^2 = 0.9996$) (Equation 2)

Figure S1. UV-Vis calibration curve of aniline tetramer.

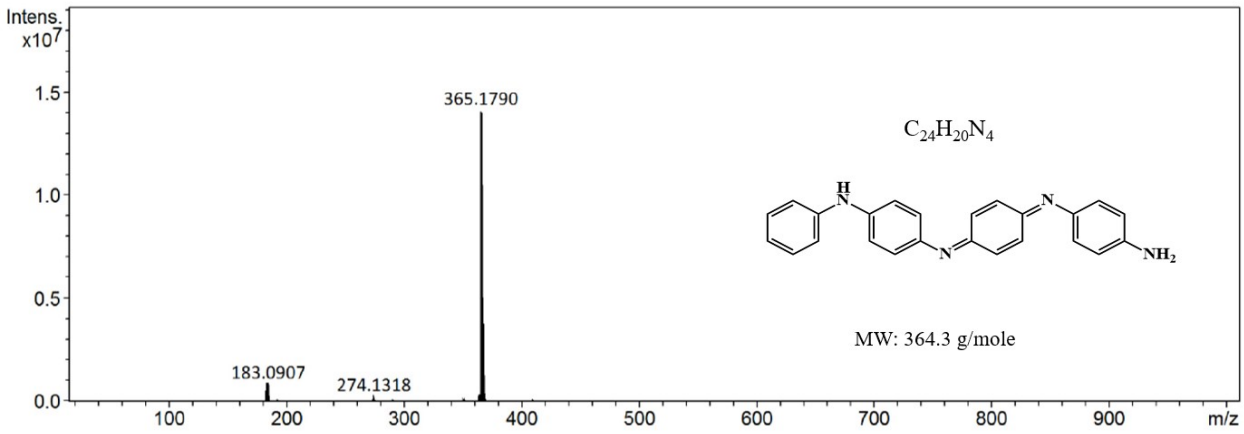

Figure S2. Mass spectrum of synthesized aniline tetramer.

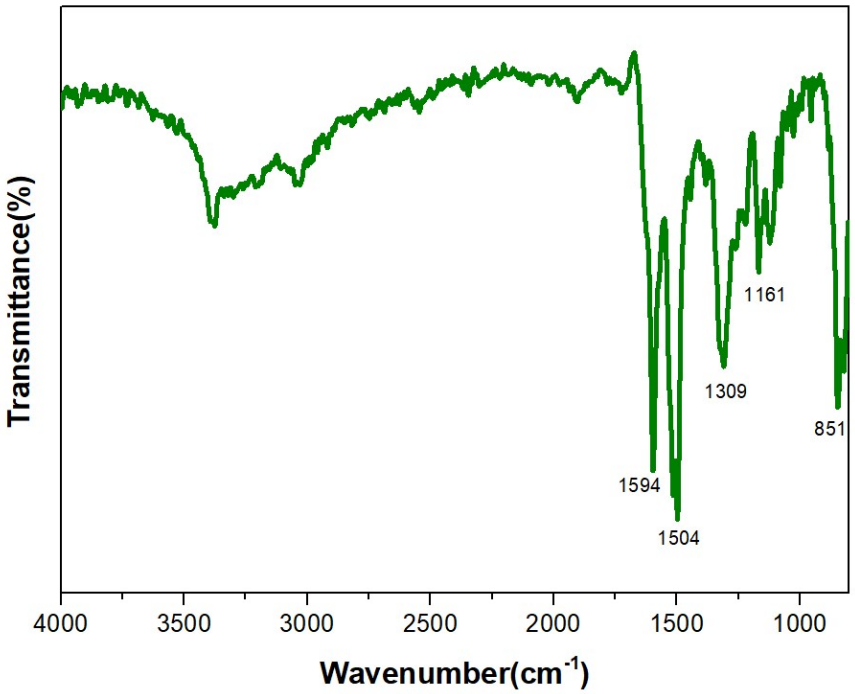

Figure S3. FTIR result for synthesized aniline tetramer.

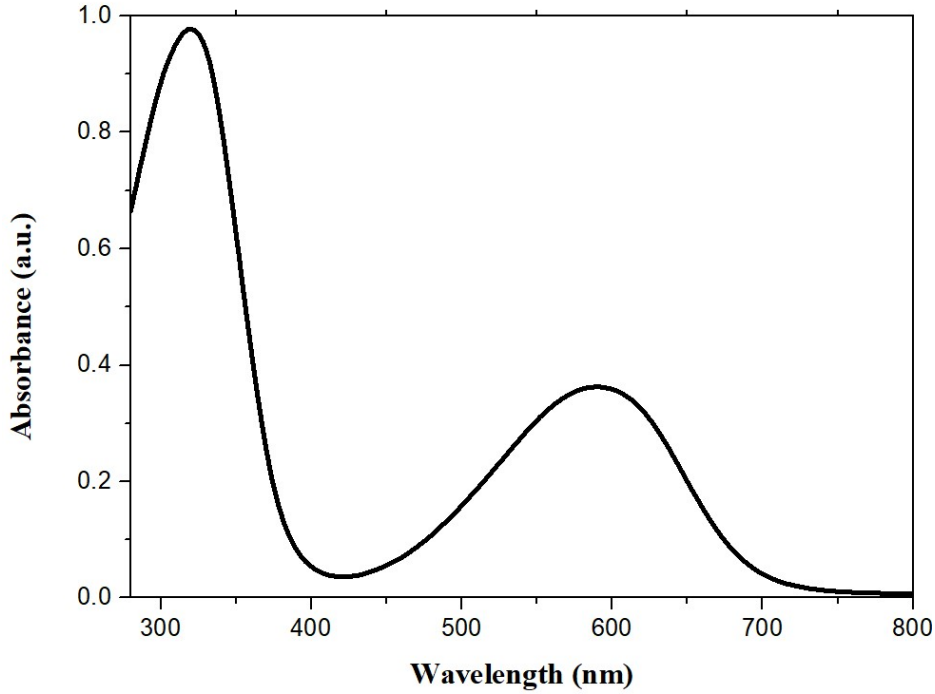

Figure S4. UV–vis spectrum of aniline tetramer in emeraldine base state.

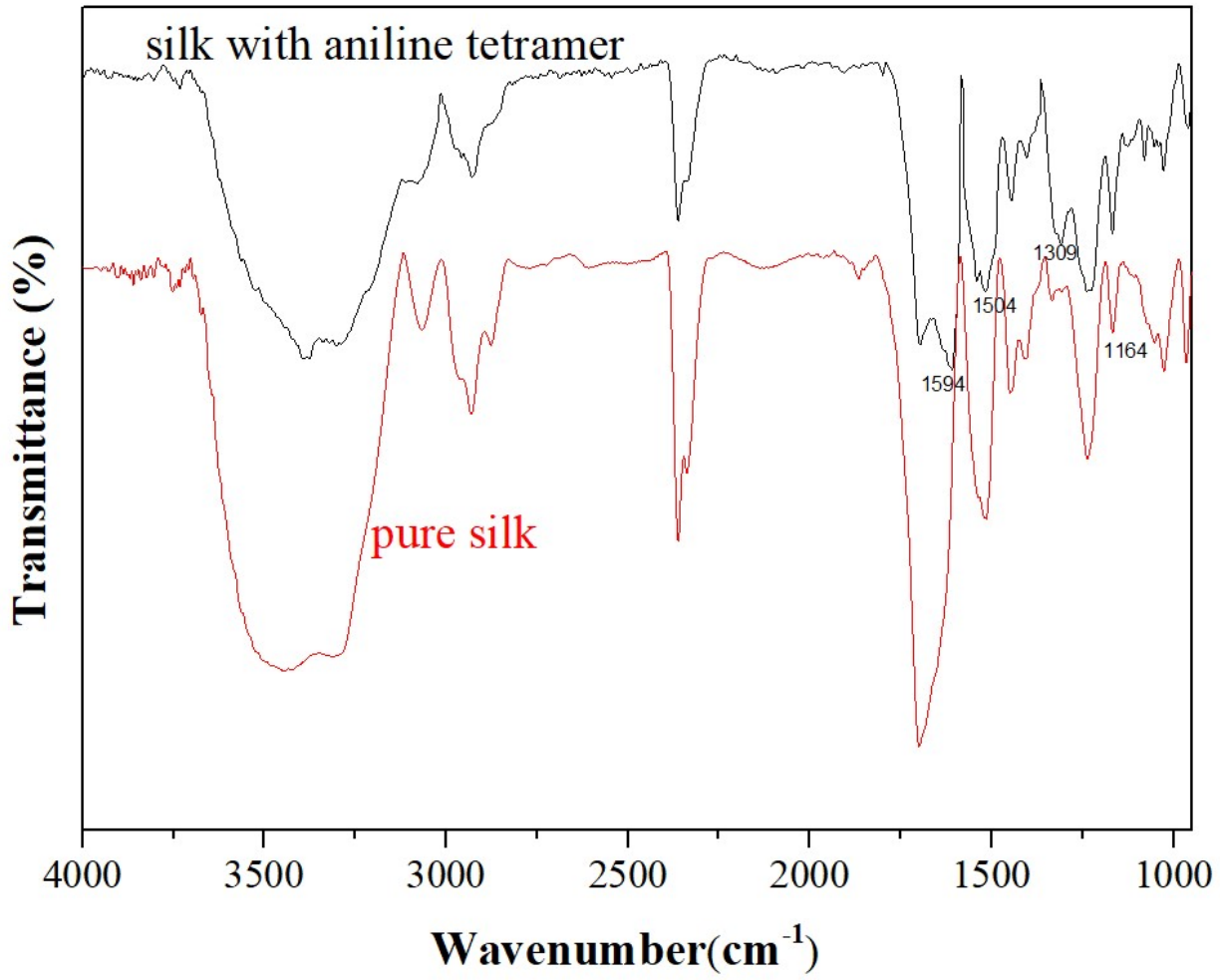

Figure S5. FTIR results for the spider dragline silk and its resulting aniline tetramer composite silk.

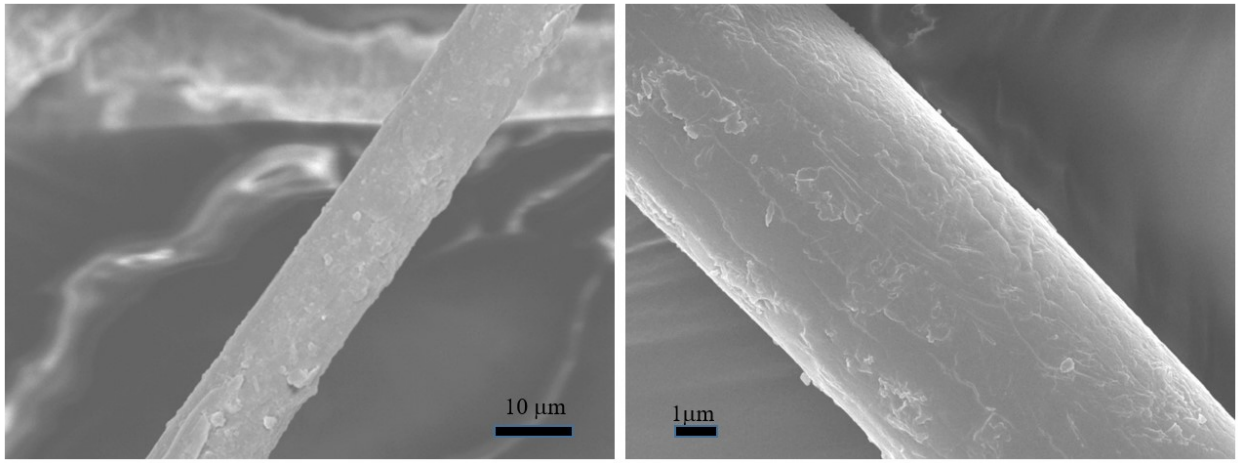

Figure S6. SEM images of spider dragline silks modified with 1% aniline tetramer solution.

(NOTE: the composite silks have been stirred in water at speed of 1000 rpm for 7 days)

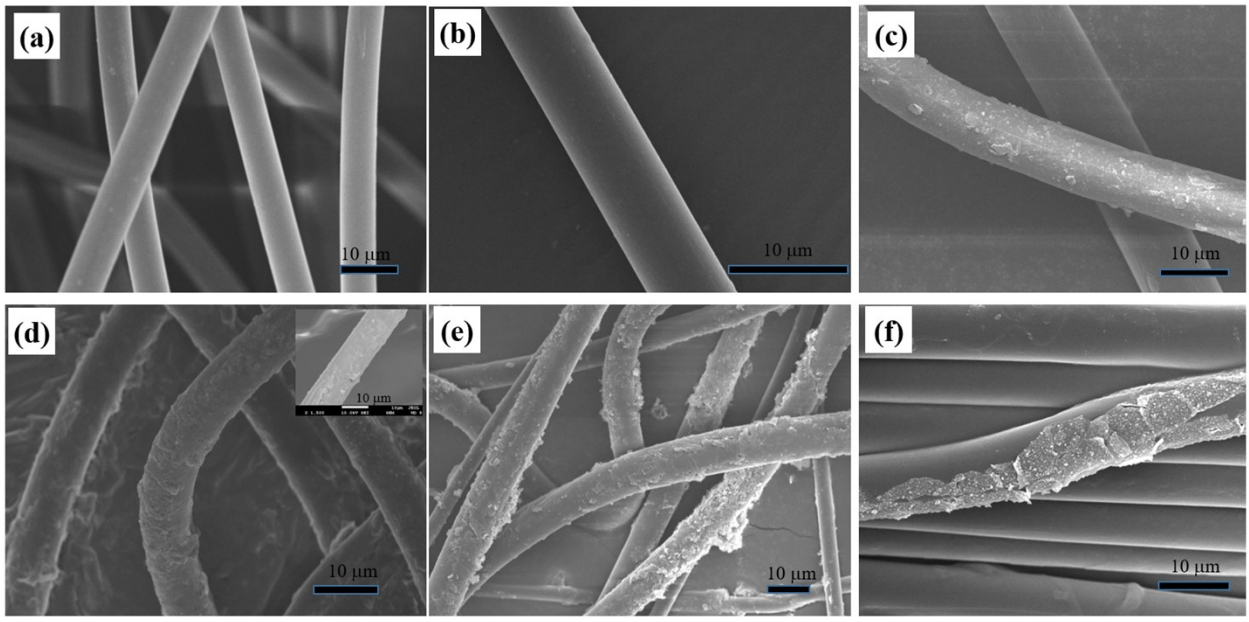

Figure S7. SEM images of spider dragline silks with various treatments. (a) hexane; (b) 95% ethyl alcohol; (c) 0.1% aniline tetramer dip-coating; (d) 1% aniline tetramer dip-coating; (e) and (f)10% aniline tetramer dip-coating.

(NOTE: the dragline silks in (c), (d), (e), and (f) were washed with hexane before aniline tetramer dip-coating procedure)

Table S1. Effect of aniline tetramer concentration on its amount coated in the silk surface.

Doping solution concentration (%)	**Aniline tetramer coating amount on the silk (mg/mg)**
0.01	0.02±0.01
0.05	0.03±0.01
0.1	0.09±0.04
1	0.24±0.07
10	6.31±0.79

(NOTE: the dragline silks did not wash with hexane before aniline tetramer dip-coating procedure)

Table S2 EDX analysis for various silk fibers

	virgin silk fibers	Hexane treatment	Ethyl alcohol treatment	Aniline tetramer modification
Element	Atomic%	Atomic%	Atomic%	Atomic%
C (Kα)	56.2±2.5	57.3±0.7	55.6±3.1	56.7±1.5
N(Kα)	20.8±1.1	24.2±1.4	22.6±1.6	22.2±1.1
O(Kα)	22.9±3.4	18.4±1.0	21.8±3.2	21.4±2.5

NOTE:

Hexane treatment: dragline silks were washed in hexane for ten minutes.

Ethyl alcohol treatment: dragline silks were washed in 95% ethyl alcohol for ten minutes.

Aniline tetramer modification: composite dragline silks prepared without washing step before 0.1% aniline tetramer dip-coating procedure.