Electronic Supplementary Information

Stretchable multi-luminescent fibers with AIEgens

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Experimental Section

Fabrication of AIE fibers

The AIE molecule was first dissolved in toluene with stirring. Base polymer (part A) of PDMS (Sylgard-184, Dow Corning) was added in AIE solution with vigorous stirring, and then the mixture was put into vacuum chamber until all the solvents are evaporated. Subsequently, cross-linker agent (part B) (mixing ratio of A and B is 10:1) was added and mixed by hand for 2 min. The mixture was then degassed in a vacuum chamber until that all visible bubbles formed during the mixing process disappear. Then a pre-curing at 60 ^{o}C for 15 min. was conducted. Then, the precursor was transferred into an injection syringe, and, at the same time, the clean silicone oil bath was heated to 170 to 180 ^{o}C. It is worth emphasizing that more uniform the temperature of silicone oil leads to better fiber quality, because the fibers were cured in hot oil within only 3 s and abnormal deformation wound been induced if the temperature vibration causes different thermal expansion of fibers. When the oil bath was ready, certain amount of AIE fibers precursor was extruded by the injection syringe into the oil bath in a short time. After a few seconds, the AIE fibers were ready and continuously drawn out by a coil. Lastly, the fibers were washed by using daily detergent, deionized (DI) water, and dried at 60 ^{o}C.

Characterization

SEM images were taken with a Hitachi SU8200. Fluorescence spectra were taken with the PerkinElmer LS 55. Confocal laser scanning fluorescence microscope images were taken with a Nikon C2+. The mechanical properties were obtained by an Instron 5944. All fluorescent photos were taken with 365 nm UV excitation.

Table 1. Photoluminescence Quantum Yield (PLQY) of luminescent fibers with 0.5wt % AIEgens.

Fibers	PLQY (Initial)	PLQY (After 100 cylces of 30% stretching)
AIE-R	44.86%	36.78%
AIE-G	87.92%	88.18%
AIE-B	51.12%	44.66%

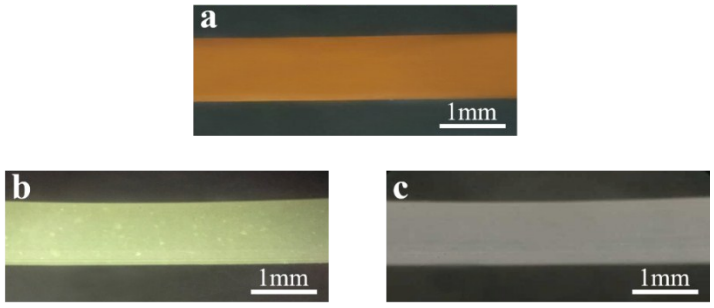

Fig. S1. Optical microscope image of the three different colour AIE fibers. a) Red AIE fiber. b) Green AIE fiber. c) Blue AIE fiber.

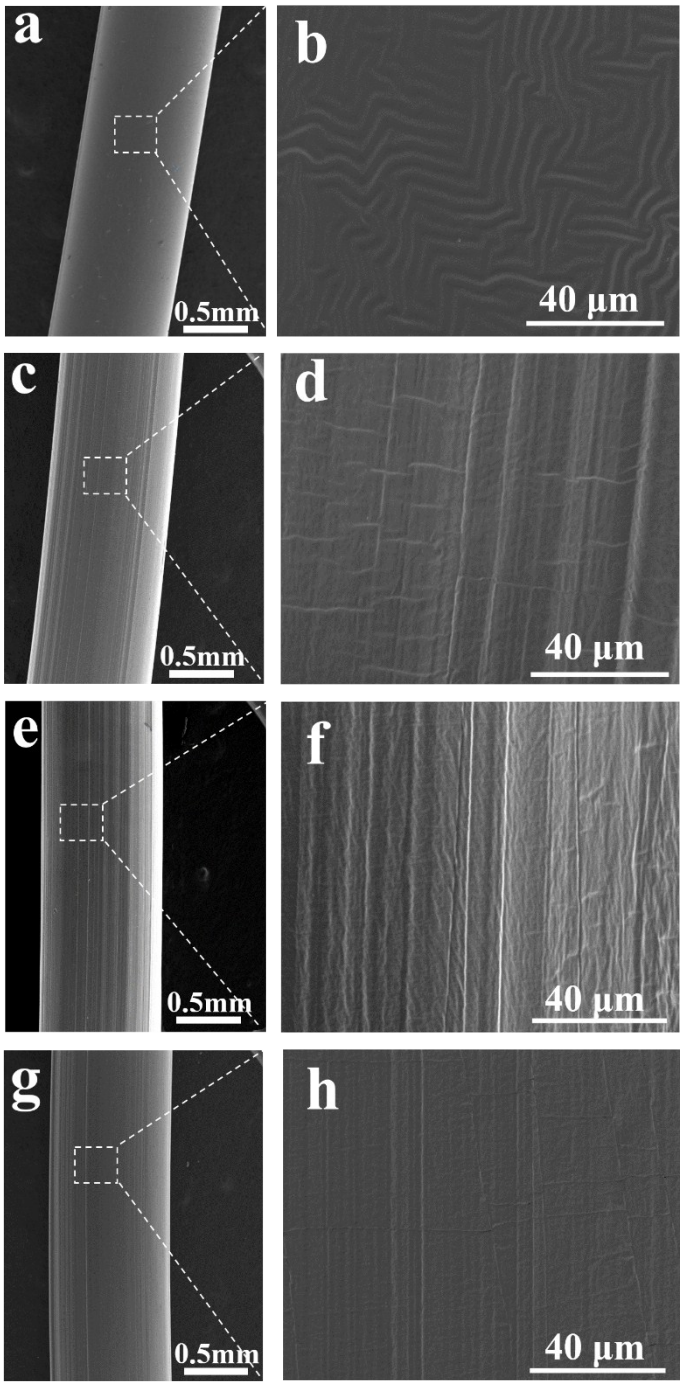

Fig. S2. SEM characterization of AIE fibers. a-b) The surface of pure PDMS fiber. c-d) 0.3wt% AIE-G fiber. e-f) 0.5wt% AIE-G fiber. g-h) 1.0wt% AIE-G fiber.

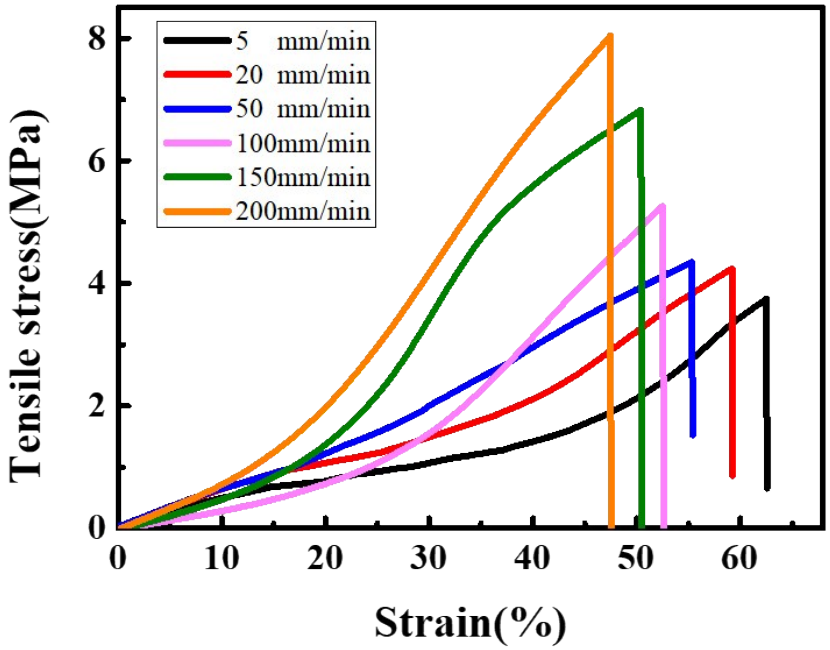

Fig. S3. Tensile behaviors of pure PDMS fiber under different deformation rates in the range of 5 to 200 mm/min.

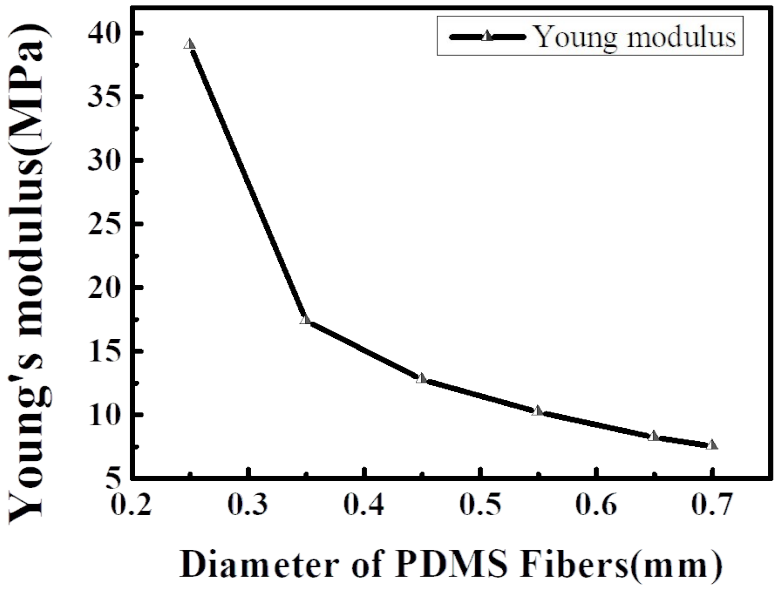

Fig. S4. Young's modulus of PDMS fibers.

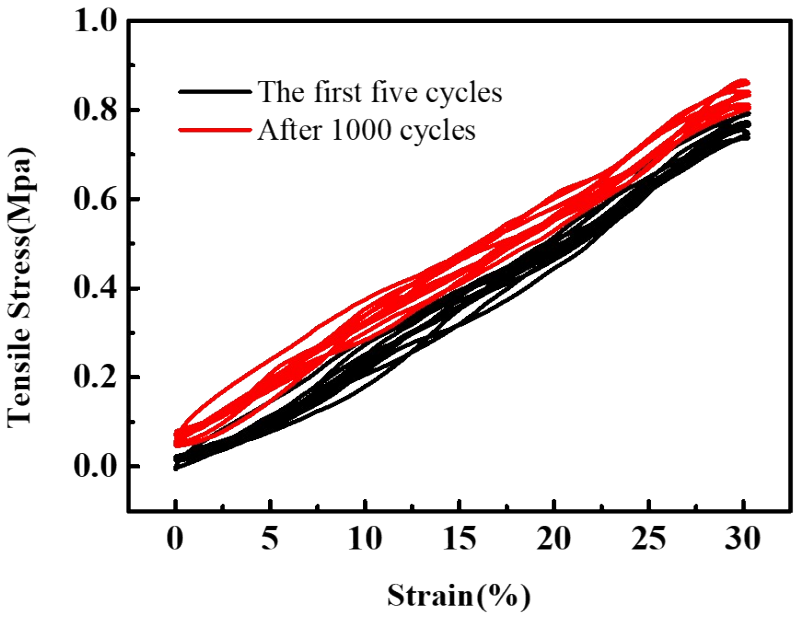

Fig. S5. Incremental cycles loading and unloading test on 0.5% AIE-G fiber from 0 to 30% strain

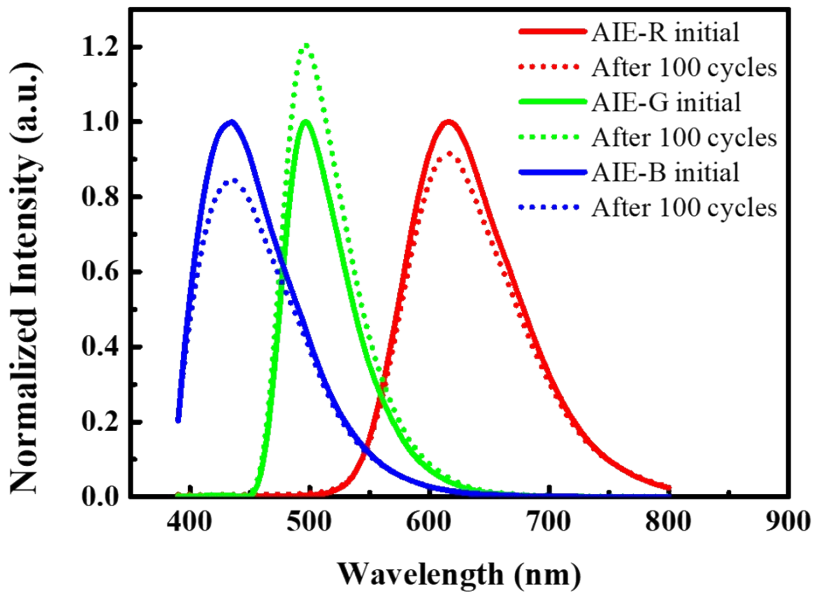

Fig. S6. The normalized photoluminescence spectra of the AIE fibers with different emission lights before and after 30% strain stretch-release cycles.