

### **Description of Additional Supplementary Files**

File Name: Supplementary Movie 1

Description: Continuous fiber spinning via NVIPS spinning approach using an extrusion-based process

File Name: Supplementary Movie 2

Description: Manual fiber spinning via NVIPS spinning approach. Solvents were removed due to the NVIPS and gravity effects

File Name: Supplementary Movie 3

Description: Manual fiber spinning via NVIPS spinning approach. Solvents were removed due to the NVIPS and gravity effects

File Name: Supplementary Movie 4

Description: Observation of the liquid droplets moving and merging under an optical microscope

File Name: Supplementary Movie 5

Description: Comparison of mechanical properties between fibers prepared via NVIPS spinning and wet spinning approaches. PAN fibers@WS were very brittle. PANSion fibers@WS were not stretchable. PANSion fibers@NVIPS were stretchable and strong

File Name: Supplementary Movie 6

Description: Monitoring high-frequency movement by a selfsensing PANSion fiber