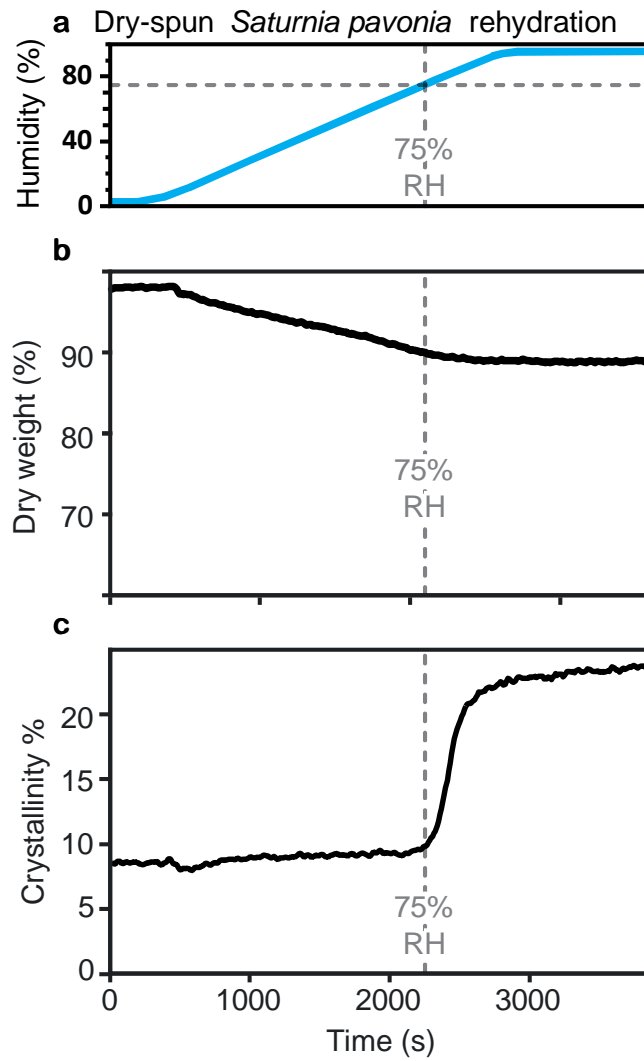
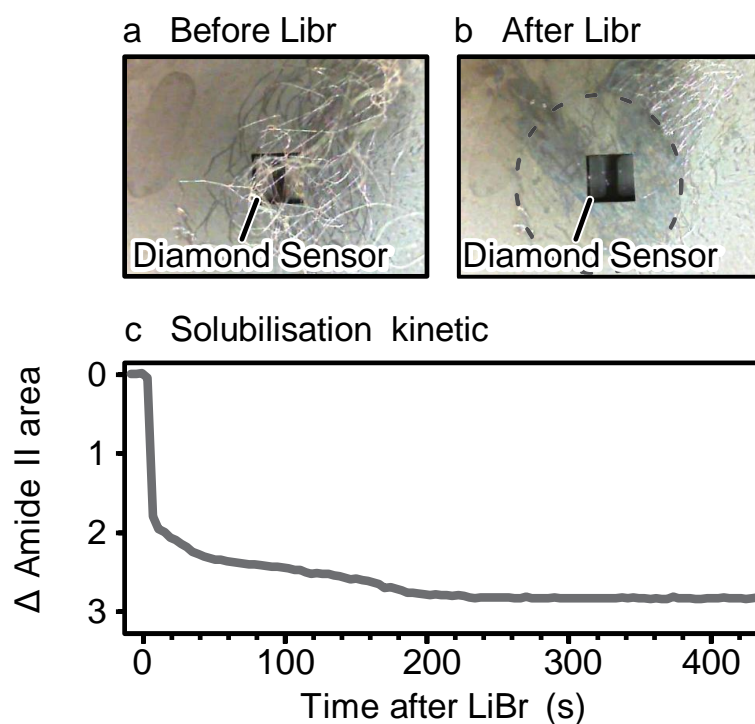


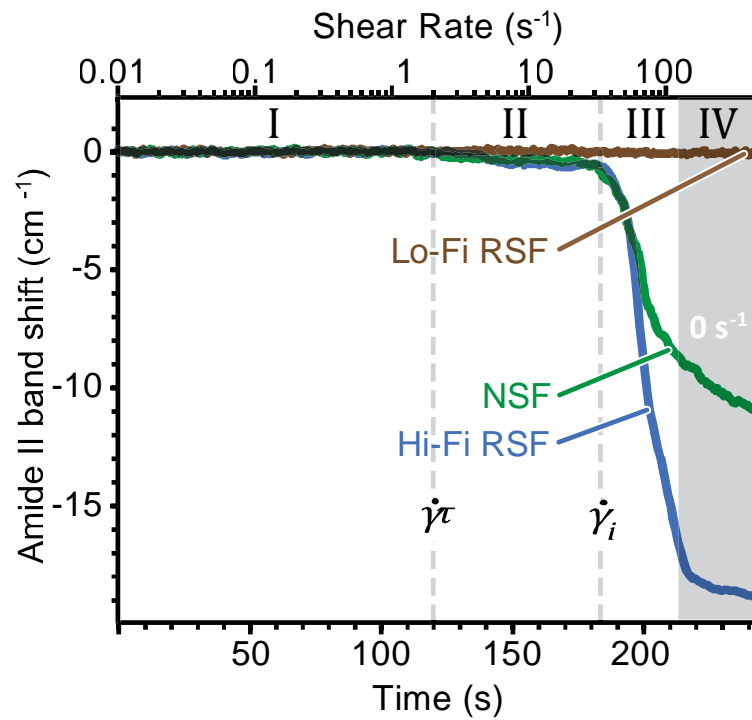
**Fig S1. Sericin infrared spectra.** Low wavenumbers infrared spectra region of fibroin (red) and sericin (blue) extracted directly from *Bombyx mori* glands. Infrared spectra of sericin-free degummed (grey) and undegummed (green).



**Fig S2. Dry-spun saturnia pavonia rehydration kinetic.** (a) Relative humidity as a function of time (s) from 1% RH and 96% RH. (b) Dry weight fraction (i.e., dry mass / wet mass) and (c) crystallinity fraction of a single *Saturnia Pavonia* fiber immediately during rehydration.



**Fig S3 Room temperature dry-spun fiber solubilisation in LiBr.** (a) Photographs of the dry-spun fibers before and (b) after LiBr solubilisation at 25°C on the ATR sensor. (c) Amide II band area difference of dry-spun silk fibers flowing submersion in LiBr 9.5M at 25°C. The decreasing protein absorbance indicates that fiber proteins solubilized within 300 seconds. The interfering absorption from LiBr prevented the use of the dry weight fraction quantification method PLS.



**Fig S4. Amide band shift during Rheo-IR shear ramp.** Amide II band shift as a function of time while undergoing an exponential shear ramp from 0 to 150 s<sup>-1</sup> for *Bombyx mori* native silk feedstocks (NSF, green), high-fidelity reconstituted silk feedstock (Hi-Fi RSF, blue) and low-fidelity reconstituted silk feedstocks (Lo-Fi RSF, brown) at 22 ± 3% DW.