Supporting Information

for

Anisotropic nanocomposite films of hydroxypropylcellulose and graphene oxide with multi-responsiveness

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Table S1. Composition of the aqueous mixture for the synthesis of anisotropic composite films

Sample	GO suspension (mL) [a]	HPC (g)	H_2O (g)
H-50	0.0	6.0	6.0
GH-0.004-50	0.4	6.0	5.6
GH-0.008-50	0.8	6.0	5.2
GH-0.016-50	1.6	6.0	4.4
GH-0.032-50	3.2	6.0	2.8
GH-0.04-50	4.0	6.0	2.0
GH-0.05-50	5.0	6.0	1.0
GH-0.06-50	6.0	6.0	0.0

[a] The content of GO in the aqueous suspension is 1.2 mg mL^{-1}.

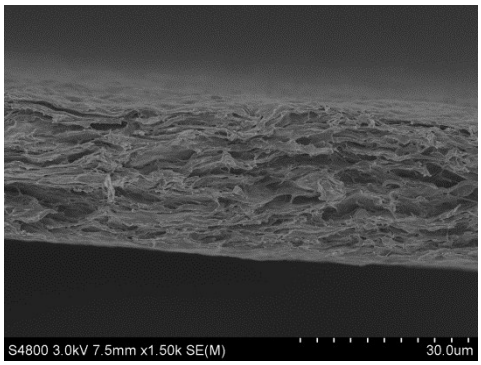

Figure S1. SEM image of the cross-section of GH-0.04-50 composite film.

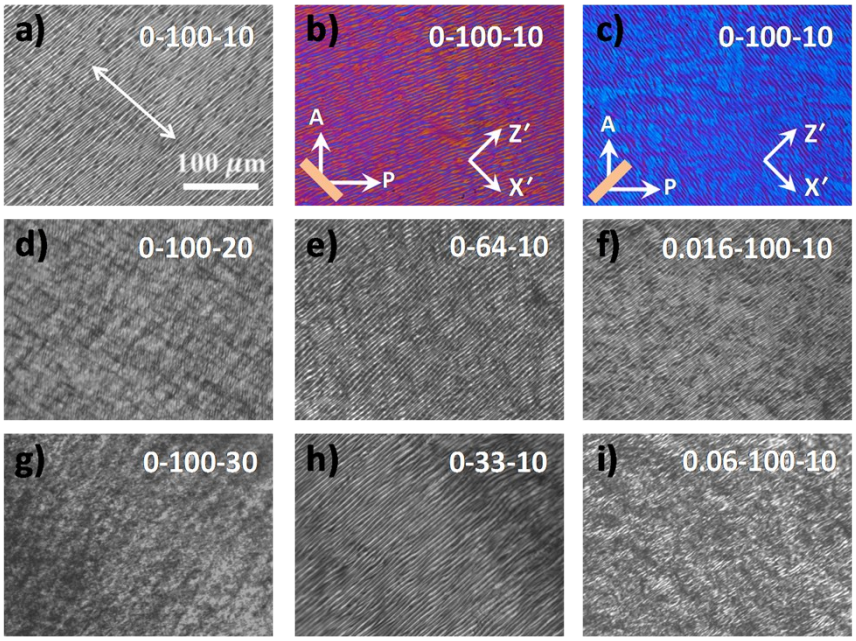

Figure S2. POM images to show the influences of film thickness (a,d,g), shear rate (a,e,h) and GO content (a,f,i) on the formation of band texture of composite films with 50 wt% HPC. Samples are coded as *m*-*n*-*p*, where *m*, *n*, *p* denote the GO content (wt%), shear rate (s^{-1}), and film thickness (μm), respectively. (b) and (c) are taken with insertion of 530 nm tint plate. A: analyzer; P: polarizer; Z': slow axis of the tint plate; X': fast axis of the tint plate.

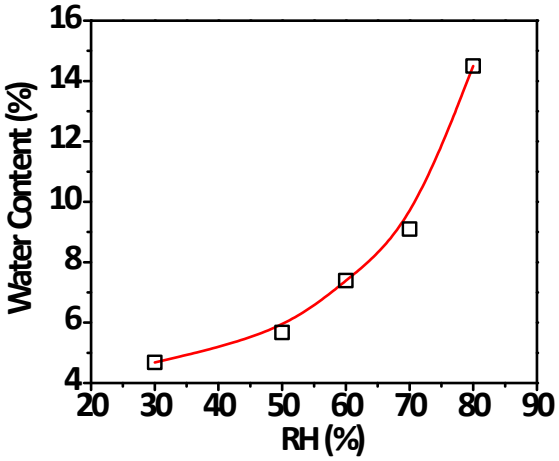

Figure S3. Relationship of water content and relative humidity of H-50 films.

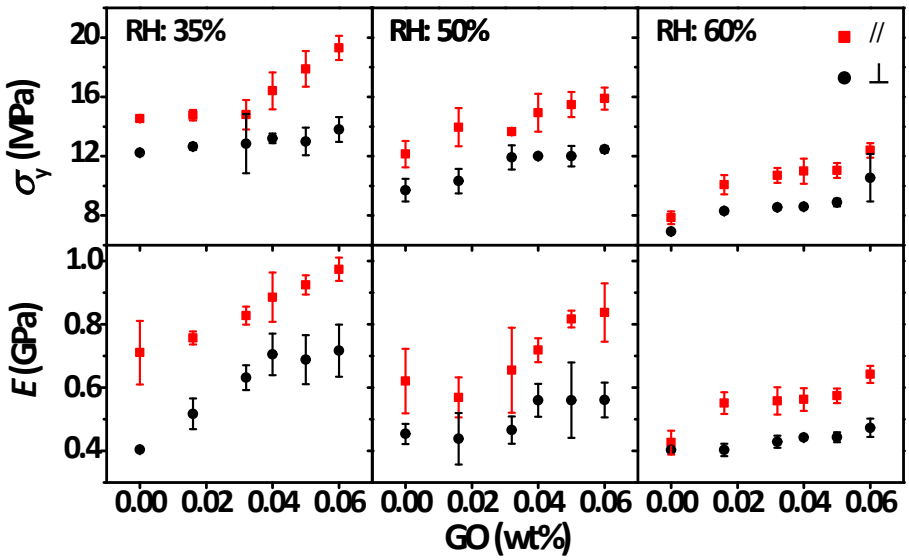

Figure S4. Yield stress (σ_y) and Young's modulus (E) of the composite films with different GO content. The tests were carried out at a stretch rate of 80 mm min^{-1} and different relative humidity.

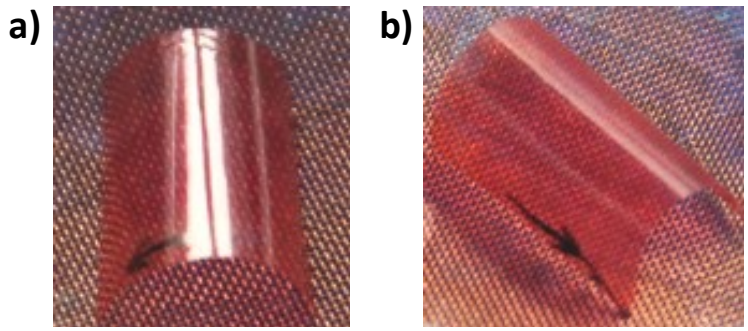

Figure S5. Photos of H-50 free standing films with glass bottom surface (a) and free top surface (b) exposed to the higher relative humidity. RH above the film was 70% and RH below the film was 40%. The arrow indicates the shear direction.

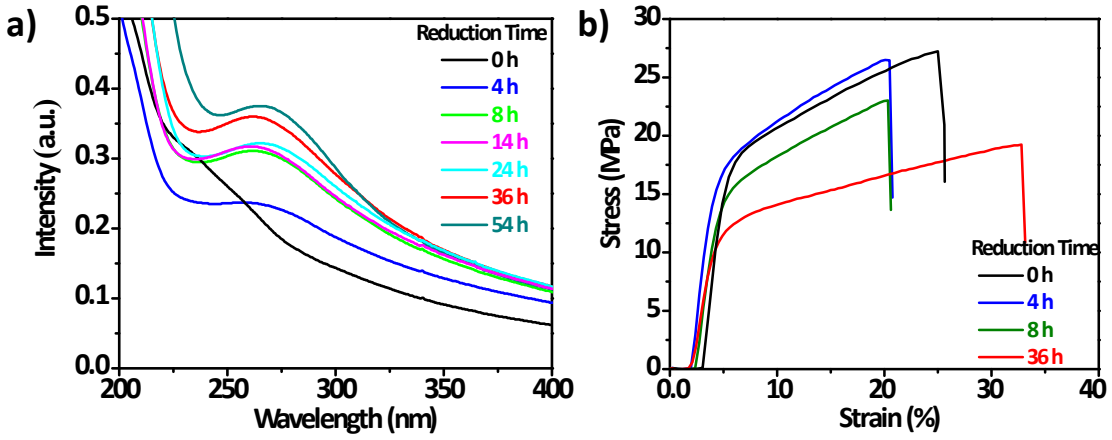

Figure S6. (a) UV-vis absorption spectrum of GH-0.06-50 films after exposed to 254 nm UV light irradiation for different time. (b) Stress-strain curves of UV irradiated GH-0.06-50 films being stretched parallel to the shear direction. The tests were carried out at a stretch rate of 40 mm min^{-1} and relative humidity of 35%.