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Facile fabrication of highly sensitive and durable cotton fabric-based pressure sensors for motion and pulse monitoring

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Electronic Supplementary Information

S1 Gravimetric method for measuring GNs contents in different graphene/gelatin dispersions.

The certain volume of GGD was measured as V_0 (mL), and then removed the gelatin by vacuum filtration (microfiltration membrane with 1μm aperture was bought from Jinteng Experimental Equipment Co., Ltd (China)) to obtain GNs, followed by drying in an oven at 60℃ to remove the water until getting the constant weight as m (mg). Then the contents of GNs in GGD can be obtained $C = \frac{m}{V_0}$.

Table S1 GNs contents in GGD after centrifugation.

Samples	GGD0	GGD1	GGD2	GGD3	GGD4
mg/mL	0.59	1.81	2.33	2.90	3.56

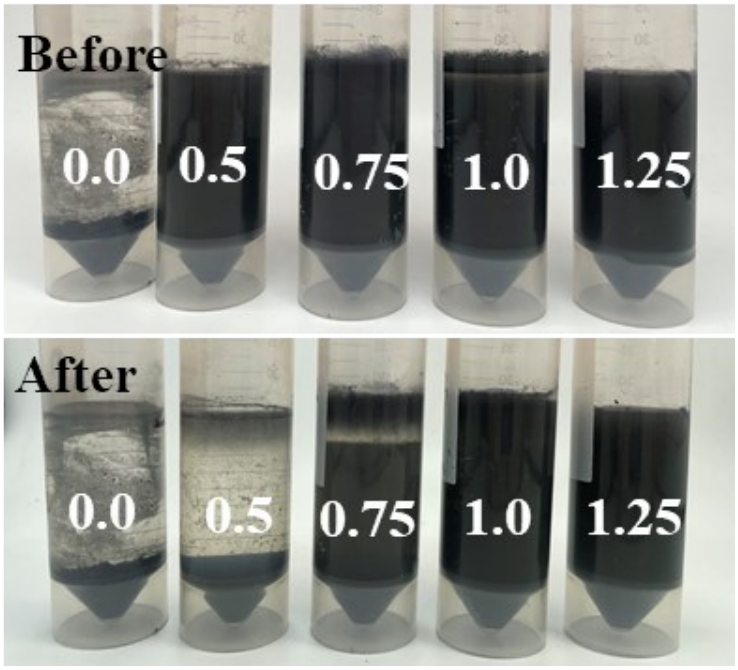

Figure S1. Stability of different GGD with gelatin concentrations of 0, 0.5, 0.75, 1.0 and 1.25 wt% before and after standing at room temperature for 3 weeks.

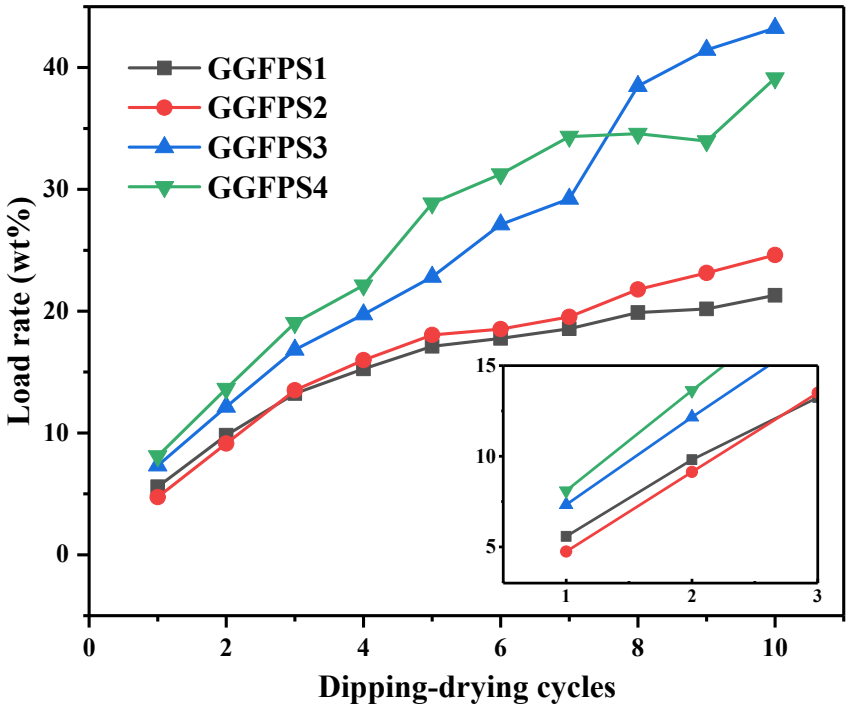

Fig. S2 Load rate of different GGFPS after different dipping-drying cycles.

The effect of dipping-drying cycles on the load of GGFPS immersed in different GGD was presented in Fig. S2. All samples were measured 5 times. As increasing the dipping-drying cycles, the load rate of GGFPS increased. After 5 dipping-drying cycles, the weight increments were 17.11, 18.05, 22.82 and 28.86 wt%, respectively compared with pure cotton fabric. Subsequently, the weight increments for GGFPS1 and GGFPS2 slowed down, while GGFPS3 and GGFPS4 continuously increased. After 10 dipping-drying cycles, load rate was 21.30, 24.62, 43.24 and 48.05 wt%, respectively. At the beginning, there were more blank areas on the cotton fibers, which meant the greater possibility of contact between the GNs and fibers, resulting in the significant weight increments in previous 5 cycles. However, after multiple cycles, GNs could bridge the large gaps and cover the cotton fibers due to the flake form which could not adsorb the subsequent GNs. For GGFPS3 and GGFPS4, more gelatin with abundant active sites and hydrophobic groups strengthened the hydrogen bond and hydrophobic interactions, leading to more coating.

Movie S1 Resistance change under different pressure.

Movie S2 Cyclic washing tests of GGFPS.

Movie S3 Cyclic loading and un-loading tests of GGFPS.

Movie S4 GGFPS was used to monitor the pulses in real-time.