The tensile strength and strain curve of the GO/PVA

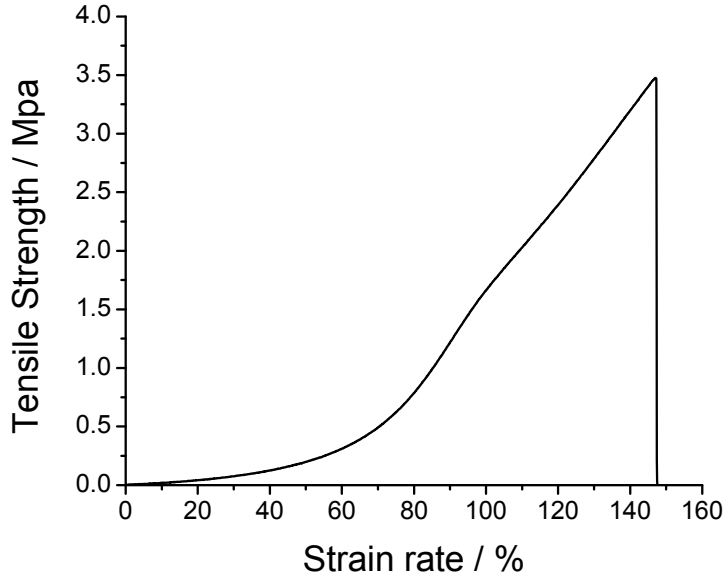

Fig. S1 - The tensile strength and strain curve of the GO/PVA with 0.8 wt% GO loading.

TGA and DSC analysis

TGA is a commonly used method to test the composition and thermal stability of composite materials. The TGA diagrams of PVA and GO/PVA composite with 0.8 wt% GO are shown in Fig. S2. The curves were obtained by heating the samples to 800 °C at a rate of 6 °C /min under a nitrogen atmosphere. Both pure PVA and the composite show a two-step decomposition: a large mass loss starting below 100 °C, presumably due to the elimination of the residual water in the PVA matrix; and a small loss at about 220 °C, presumably due to the decomposition of functional groups and carbonization. The two TGA curves practically overlap however the curve of the composite is shifted toward a slightly higher temperature compared to that of the pure PVA. This

indicates that the addition of GO at low concentration slightly improved the thermal stability of the composite.

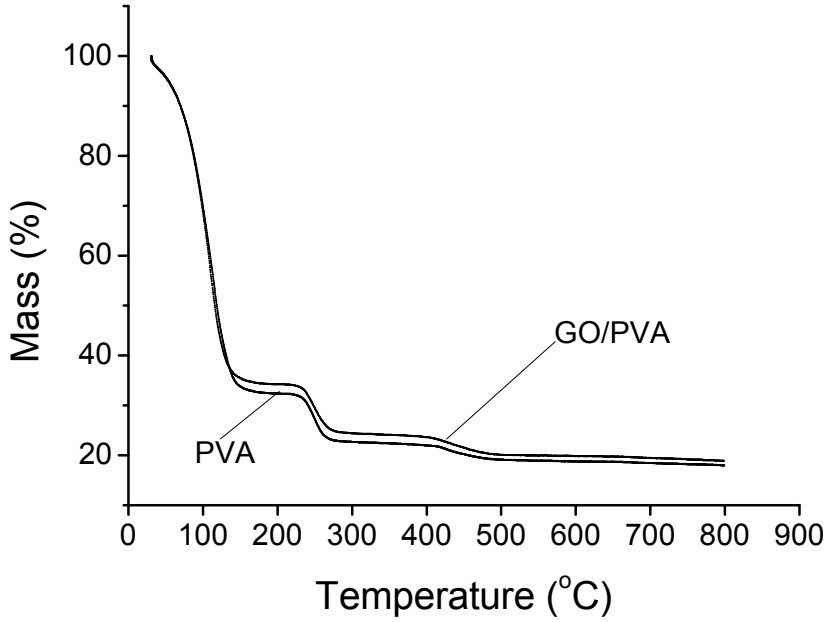

Fig. S2 - TGA curves of pure PVA and GO/PVA composite with 0.8 wt% loading.

DSC was used to measure the melting enthalpy of the samples and the results are shown in Fig. S3. The melting peaks are all in the temperature range of 240–270 ^{o}C, which indicates that the GO has no apparent effect on the melting behavior of PVA hydrogels.

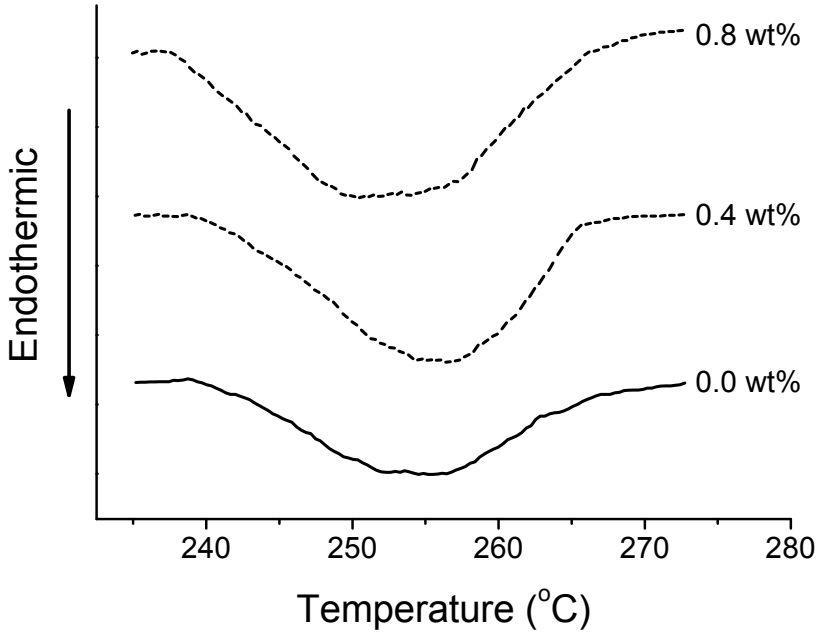

Fig. S3 - Melting peaks of PVA and GO/PVA hydrogels with 0.4 wt% and 0.8 wt% GO.

The density of each tested sample

Table S1 - The density of each tested sample

GO content (wt%)	0.0	0.4	0.6	0.8	1.0
Density (g/cm^3)	1.0392	1.0345	1.0311	1.0289	1.0274