

Electronic Supplementary Information for

Mass-produced SEBS/graphite nanoplatelets composites with a
segregated structure for highly-stretchable and recyclable strain
sensors

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Fig. S1 Photo showing the unattached GNPs and ethanol could be easily separated from filtering fluid using filter paper.

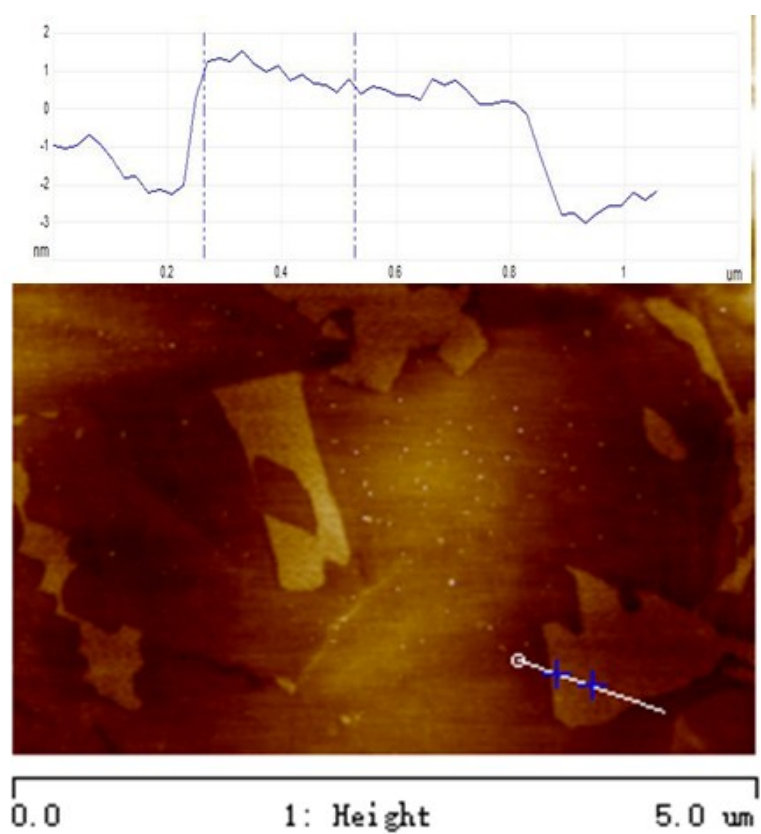


Fig. S2 AFM image of GNPs.

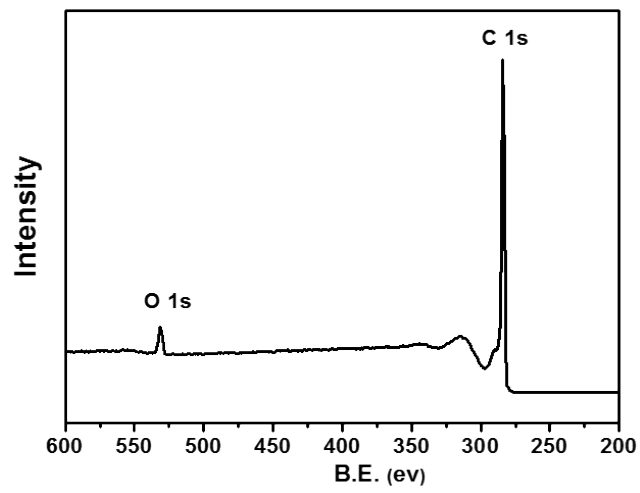


Fig. S3 XPS spectrum of GNPs.

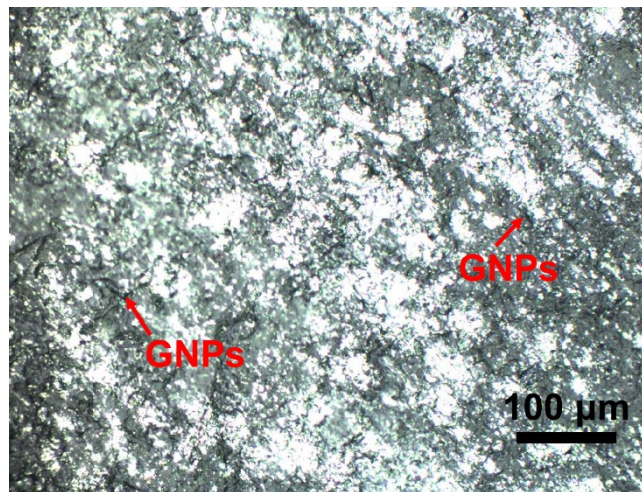


Fig. S4 Optical micrograph of SEBS/GNPs composite.

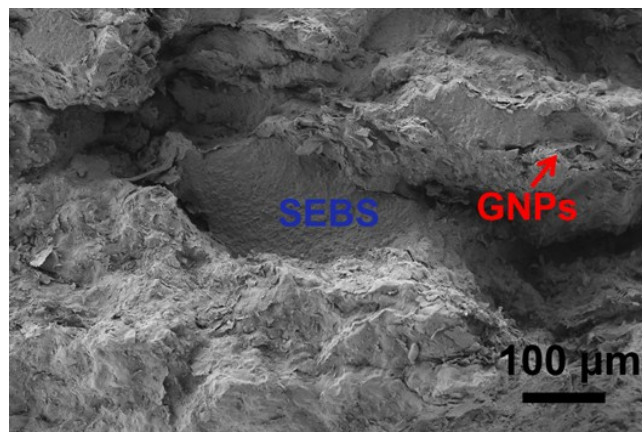


Fig. S5 Cross-section SEM image of recycled G1.1 composite.

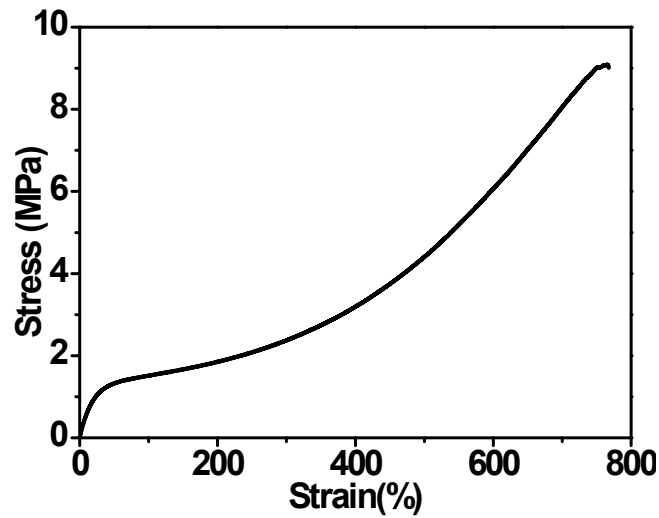


Fig. S6 Stress-strain curve of pure SEBS sheet.

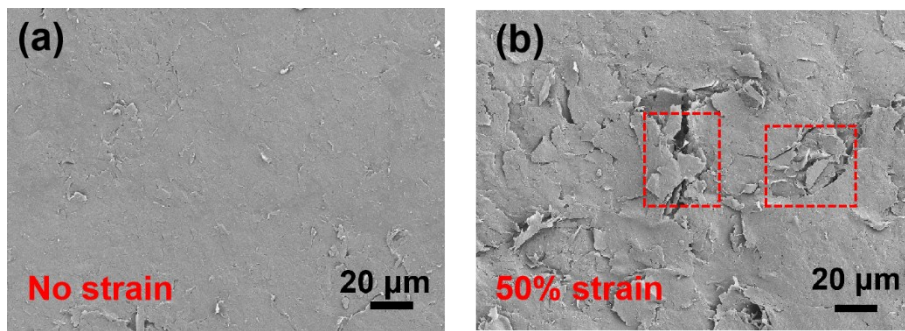


Fig. S7 Surface SEM images of the G1.1 composite with (a) no and (b) 50% strain.

On the surface SEM image of the specimen with no strain (Fig. S7a), we could see a smooth surface and the continuous GNPs networks could be formed along the in-plane direction, which could be related to that the GNPs nanoplatelets were attached to the surface of SEBS powders in advance and the GNPs could align along horizontally after the hot-pressing process. While under 50% strain, we could observe the destruction of GNPs networks and obvious separation between adjacent GNPs nanoplatelets, as shown in Fig. S7b red zones.

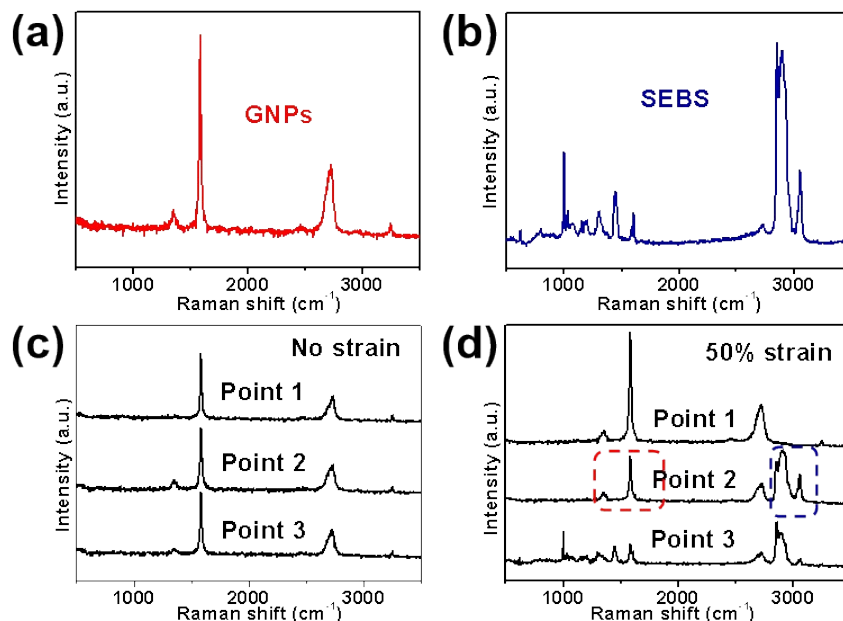


Fig. S8 Raman spectra of (a) GNPs, (b) SEBS and the G1.1 composite with (c) no and (d) 50% strain.

For pure GNPs powder, there existed the characteristic peak at about 1590 and 1360 cm^{-1} responding to the G and D band, respectively; for pure SEBS sheet, there mostly existed the characteristic peak at about 1000, 1450, 2850, 2910 and 3050 cm^{-1} , respectively. On the Raman spectrum of composite at no strain, we observed different points of the surface and found that at every point there only appeared the characteristic peaks of GNPs, which was because that the GNPs networks were well formed and there were almost no SEBS phase exposed on the surface. While after 50% strain, we could see different peaks appearing at different points. For example, at Point 1, the characteristic peaks of GNPs appeared; at Point 2, the characteristic peaks of GNPs and SEBS both appeared; at Point 3, the characteristic peaks of SEBS mostly appeared. The difference of Raman spectra for the stretched specimen might be because the GNPs networks were destructed and the SEBS phase could be exposed on the surface after the deformation.



Fig. S9 Photo showing a strain sensor made of dumbbell specimen of G1.1 composite.