

Note 1

The tensile tests of M0(0% rubber), M2(10% rubber), and M4(20% rubber) are conducted to study the effect of increasing polymer content to the maximum tension. As shown in Figure S1, the maximum tension of M0(0% rubber) is 0.193kgf, while the maximum tension of composite material M2(10% rubber) is 0.501kgf. The maximum tension of M2 increases by 2.6 times, after adding 10% rubber into the pure carbon film. Clearly, adding rubber in the pure carbon film can improve the maximum tension greatly. And the results can be gotten from the figure that maximum tension of the composite material increases, with the increase of the rubber content.

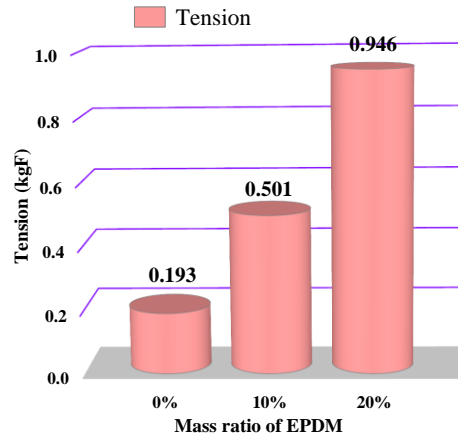
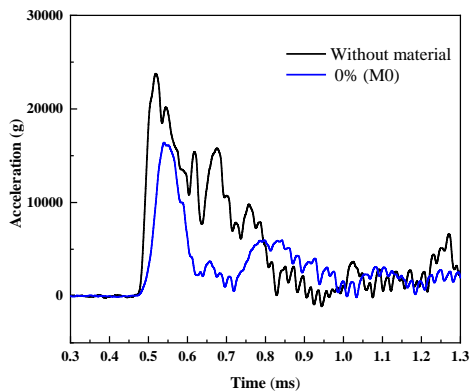


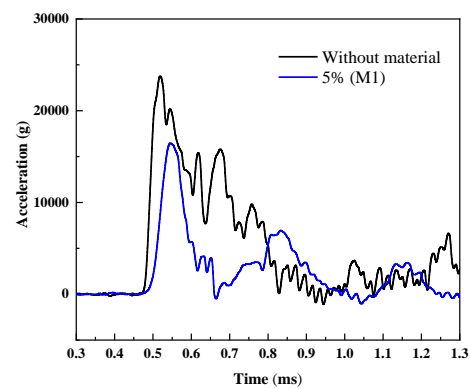
Figure S1 Maximum tension of test materials containing different proportions of EPDM .

Note 2

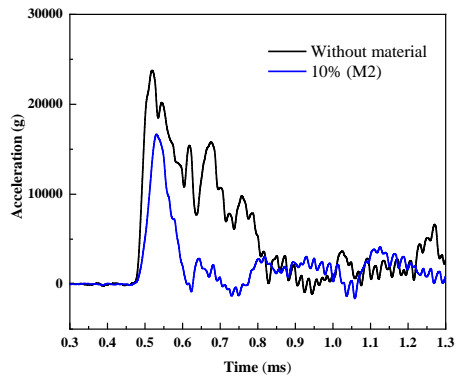
The curves buffered by M0-M6 are respectively shown in Figure S2(a)-(g). The acceleration signals are similar to the typical signal of a penetration process [29]: the rising edge is realized in a short time, and the falling edge requires much time and exhibits a high number of oscillations. After it is buffered by the test material, the peak acceleration is evidently damped, and the overload becomes effectively weakened in the process. First, the buffered curve exhibits a certain time delay in the rising edge compared to the unbuffered process. Second, the buffered curve exhibits smaller oscillations (amplitude) in the falling process, thereby indicating that the test materials have a better shaping effect on the waveform and can effectively reduce the oscillation signal.



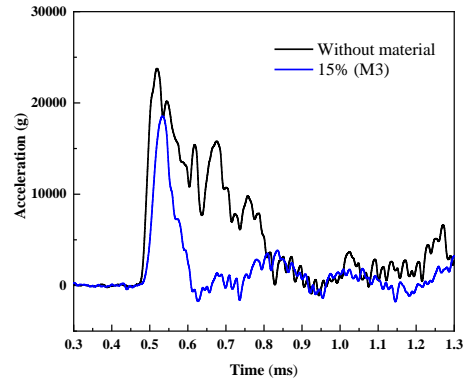
(a)



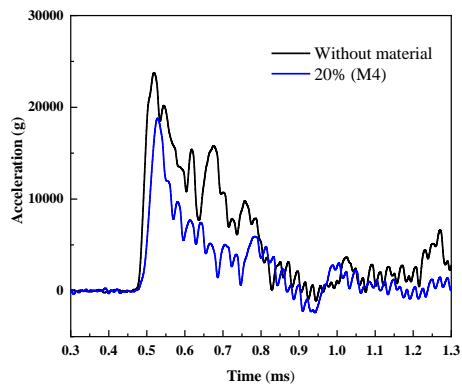
(b)



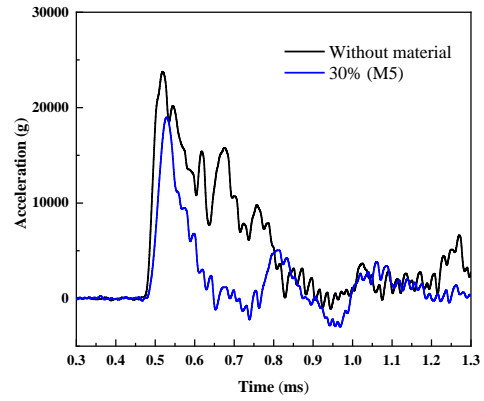
(c)



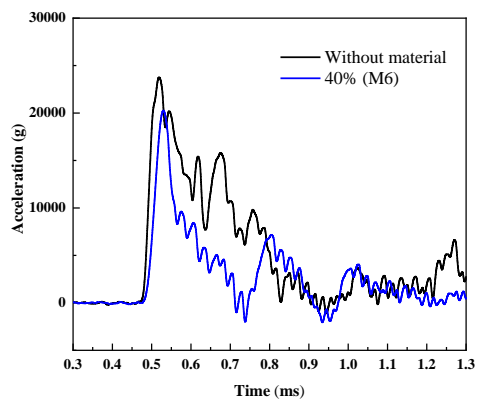
(d)



(e)



(f)



(g)

Figure S2 (a)-(g) Impact curves buffered by M0-M6 recorded by acceleration sensors.