

# Accepted Manuscript

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PII: S0266-3538(17)32922-6

DOI: [10.1016/j.compscitech.2018.02.004](https://doi.org/10.1016/j.compscitech.2018.02.004)

Reference: CSTE 7080

To appear in: *Composites Science and Technology*

Received Date: 16 November 2017

Revised Date: 30 January 2018

Accepted Date: 3 February 2018

Please cite this article as: Wang J, Jin X, Zhang X, Xia L, Li C, Wu H, Guo S, Achieving high-performance poly (styrene-b-ethylene-ranbutylene-b-styrene) nanocomposites with tannic acid functionalized graphene oxide, *Composites Science and Technology* (2018), doi: 10.1016/j.compscitech.2018.02.004.

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**Achieving high-performance Poly (styrene-*b*-ethylene-ranbutylene-*b*-styrene) nanocomposites with tannic acid functionalized graphene oxide**

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**Abstract:** In this paper, graphene oxide (GO) was functionalized with tannic acid (TA), an easy-available and low-cost plant, on the GO surface through simple ultrasound-/shearing-assisted solution blending. The TA endows GO a stronger interfacial interaction with poly (styrene-*b*-ethylene-ran-butylene-*b*-styrene) (SEBS) and greatly improves the dispersion of GO in the SEBS, resulting in a much high efficiency of GO on improving the performance of the matrix. By adding 10 wt % of TA-GO (weight ratio of TA and GO= 2:1), the dielectric constant of SEBS matrix at 100 Hz reached up to 58.7, about 27-fold and 7-fold increment compared with that of neat SEBS and SEBS/GO nanocomposites, respectively. Moreover, compared with neat SEBS, the tensile strength, modulus and fracture toughness of SEBS/TA-GO nanocomposites with the addition of 0.5 wt% of TA-GO were enhanced by 122 %, 91 % and 107 %, respectively. GO-induced fibrous SEBS and microcrack formed around GO were found and proposed as the toughening and reinforcing mechanism of TA-GO in SEBS. This study not only provides a strategy to prepare high-performance SEBS nanocomposites, but also puts forward a facile, easy, low-cost and effective strategy to enhance the graphene-polymer interfacial interaction and improve the dispersion of graphene in the polymers.

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