Accepted Manuscript

One-pot method to reduce and functionalize graphene oxide via vulcanization accelerator for robust elastomer composites with high thermal conductivity

Huanhuan Dong, Zhixin Jia, Yongjun Chen, Yuanfang Luo, Bangchao Zhong, Demin Jia

PII: S0266-3538(18)30621-3

DOI: 10.1016/j.compscitech.2018.05.047

Reference: CSTE 7250

To appear in: *Composites Science and Technology*

Received Date: 16 March 2018

Revised Date: 22 May 2018

Accepted Date: 27 May 2018

Please cite this article as: Dong H, Jia Z, Chen Y, Luo Y, Zhong B, Jia D, One-pot method to reduce and functionalize graphene oxide via vulcanization accelerator for robust elastomer composites with high thermal conductivity, *Composites Science and Technology* (2018), doi: 10.1016/j.compscitech.2018.05.047.

One-pot method to reduce and functionalize graphene oxide via vulcanization accelerator for robust elastomer composites with high thermal conductivity

Huanhuan Dong[&], Zhixin Jia[&], Yongjun Chen, Yuanfang Luo*, Bangchao Zhong*, Demin Jia

Department of Polymer Materials and Engineering, South China University of Technology, Guangzhou 510640, China.

*Corresponding author, E-mail address: psyfluo@scut.edu.cn (Yuanfang Luo); bczhong@scut.edu.cn (Bangchao Zhong).

[&] Huanhuan Dong and Zhixin Jia contributed equally to this work.

Abstract:

A high-efficiency and rapid one-step approach was developed to simultaneously reduce and functionalize graphene oxide (GO) with vulcanization accelerator 2-mercaptobenzothiazole (M) under mild conditions (2 h, 80 ^{o}C, neutral and non-toxic environmental condition). The reduced GO chemically grafted with *ca.* 25 wt% M (M-G) not only eliminated the harmful blooming of vulcanization accelerator but also reduced the irreversible graphene agglomerates and improved the compatibility between graphene and elastomer, aiding the uniform dispersion of M-G nanosheets in elastomer matrix and enhancing the graphene-elastomer interfacial interaction. As a result, elastomer composites with M-G nanosheets showed much better combination of high tensile strength, large extensibility and superior thermal conductivity than elastomer composites with hydrazine hydrate reduced GO containing equal filler and vulcanization accelerator contents. The approach of using rubber additives to reduce