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

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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 °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

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