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Functionalized graphene as an effective antioxidant in natural rubber

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ABSTRACT: To improve the thermo-oxidative aging resistance of natural rubber, a kind of functionalized graphene (FGE) was prepared by grafting 2-tert-butyl-6-(3-tertbutyl-2-hydroxy-5-methylphenyl) methyl-4-methylphenyl acrylate (GM) onto graphene oxide (GO) using (3-mercaptopropyl) trimethoxysilane as bridging agent. In comparison to GO, FGE appeared more curled surface and reached the higher water contact angle of 134°. By latex-mixing method, the uniformly dispersed FGE endowed NR vulcanizates with obviously improved thermal stability. Importantly, the NR/FGE nanocomposites exhibited excellent thermo-oxidative aging resistance, which was attributed to not only the synergistic antioxidative effect of hindered phenol groups

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