

# Accepted Manuscript

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PII: S0266-3538(18)31472-6

DOI: [10.1016/j.compscitech.2018.08.027](https://doi.org/10.1016/j.compscitech.2018.08.027)

Reference: CSTE 7360

To appear in: *Composites Science and Technology*

Received Date: 20 June 2018

Revised Date: 16 August 2018

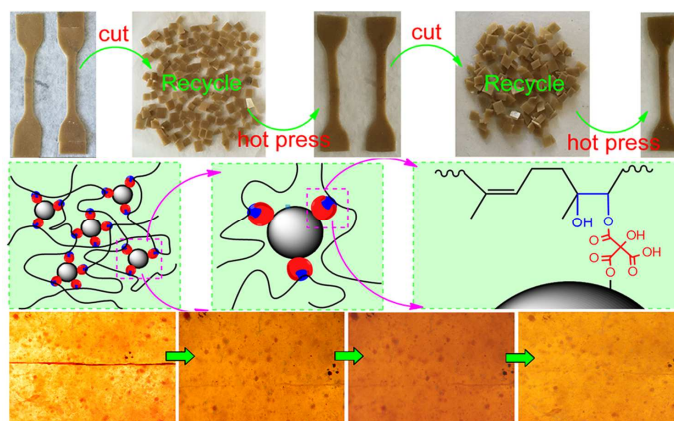
Accepted Date: 18 August 2018

Please cite this article as: Xu C, Cui R, Fu L, Lin B, Recyclable and heat-healable epoxidized natural rubber/bentonite composites, *Composites Science and Technology* (2018), doi: 10.1016/j.compscitech.2018.08.027.

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## Graphical Abstract



## Recyclable and Heat-Healable Epoxidized Natural Rubber/Bentonite Composites

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## ABSTRACT

Conventional crosslinking endows rubbers with excellent mechanical properties, at the same time, turn them to be thermosets with the impossibility of recycling and self-healing. From the perspective of sustainable development of material, it is crucial and meaningful to integrate these charming properties into crosslinked commercial rubbers. In this paper, we prepared a recyclable and healable epoxidized natural rubber (ENR)/citric acid-modified bentonite (CABt) composite. CABt with numerous carboxyls on surface served as cross-linker to covalently crosslink ENR through exchangeable  $\beta$ -hydroxyl ester linkages, as well as efficient reinforcer for ENR. Because of the transesterification reactions of  $\beta$ -hydroxyl ester linkages between CABt and ENR, ENR/CABt composites could alter the network topology at elevated temperature. Meanwhile, the low crosslink degree of network and inherent stickiness of ENR matrix facilitated chain diffusion and transesterification reactions of  $\beta$ -hydroxyl ester linkages, which made ENR/CABt composites recycled and healed. Thus, we envision that our work would open up new avenues to design more crosslinked rubber composites showing recyclable, healable and adaptable abilities.

KEYWORD: A. Polymer-matrix composites (PMCs); B. Interface; Self-healing

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