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## **Regulation of Mechanical Properties of Diene Rubber Cured by**

**Oxa-Michael Reaction via Manipulating Network Structure** 

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Abstract As diene rubber products are generally fabricated with complicated curing package involving toxic additives, the exploration of alternative green curing chemistry for diene rubber is of great importance. In this contribution, we demonstrate a curing chemistry based on oxa-Michael reaction for diene rubber to achieve the combination of simple curing system and tunable mechanical properties. Specifically, pendent hydroxyls are introduced onto the solution-polymerized styrene-butadiene rubber (SSBR) via thiol-ene click reaction and the modified SSBR is effectively cured by various acrylates without the use of any additional additives. The mechanical behaviors of vulcanizates can be widely regulated by manipulating the network structures, which is tuned by curing temperature, hydroxyl content of SSBR, content and functionality of acrylates. The correlation between mechanical properties and network structure is accordingly achieved, which provides essential basis for the future application of the diene rubbers cured by oxa-Michael reaction.

Keywords diene rubber; crosslinking; oxa-Michael reaction

## **Research Highlight**

- > The crosslinking of styrene-butadiene rubber via oxa-Michael reaction is demonstrated.
- The curing via oxa-Michael reaction is highly efficient in the absence of additional additives.
- The mechanical behaviors of vulcanizates are tunable by manipulating the network structures.

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