Chemical Science and Biomolecular Engineering

Synthesis of Bioelastomers from Soybean Oil Based Monomers

Zhao Wang[1]
Sha Sha[1]
Qinan Zhang[1]
Liqun Zhang[1*]

[1]State Key Laboratory of Organic-Inorganic Composites, Beijing University of Chemical Technology, Beijing 100029, China

Elastomer plays a very important role in our daily life. However, most synthetic elastomers are petroleum-based. To meet the growing demand for sustainable development, it is imperative to explore renewable raw materials to synthesize bio-based elastomers as next-generation rubbers. Compared with other natural materials, plant oil has a relatively high reactivity to be used as a monomer for polymerization directly. Soybean oil (SO), one of the biggest plant oil, has been found wide application in many area such as plastic, soaps, paints, coatings. Recently, soybean oil was also used for monomer to synthesize biobased elastomers. Wang *et.al.* [1] constructed a soybean oil based processable elastomer from epoxidized soybean oil and biobased diamine via ring-opening polymerization, then the obtained elastomers were cross-linked by succinic anhydride. The tensile strength of the bioelastomer with PHR-11succinic anhydride was 8.5 MPa and the elongation at break was about 200% without nanofiller reinforcement. Soybean oil based polyol and carbonated soybean oil were prepared from epoxidized soybean oil. These monomers were used to synthesize soybean-oil-based polyurethane elastomers [2,3]. These new soybean-oil-based elastomers could extend the variety of bio-based elastomers, and some of them are promising materials for the replacement of the existed petroleum-based elastomers or provide new applications. Due to the functional double bonds in soybean oil molecules, soybean oil could be easily prepared into bio-based monomers such as epoxidized soybean oil, carbonated soybean oil, soybean oil polyols, maleated soybean-oil glycerides, and so forth. These soybean oil based derivative could provide multiply stratagems for synthesized soybean oil based elastomers.

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***Corresponding author:**
Zhang L.
State Key Laboratory of Organic-Inorganic Composites, Beijing University of Chemical Technology, Beijing 100029, China, E-Mail: wangzhaoqd@163.com

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