Editorial corner – a personal view

Status, challenges and future trends of biorubber

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Natural rubber (NR) is the only biorubber source at present. World rubber consumption has reached 26.7 million tons in 2015, including 14.5 million tons synthetic rubber (SR) and 12.2 million tons NR respectively, which increased 2.7% every year since 2000 on average.

However, the rubber industry is faced to some challenges in order to meet criteria of sustainable development. SR industry is based of fossil feedstock, and its excessive carbon emission is another urgent problem. The production of NR is limited for its narrow tropic planting area and weak resistance to plant diseases and insect pests. Furthermore, NR production is labor intensive and destruction of tropical rainforests also impedes the further development of NR.

Using renewable agricultural and biomass feedstock to develop the new generation biorubber is an effective way to meet these challenges. For NR, consortiums, such as PENRA, EU-pearls etc, have been organized in America and European Union to make use the Russian dandelion and guayule as the alternative NR sources. China has also organized the PSNRR consortium to develop its own secondary natural rubber resources (SNRs), which include Russian dandelion, guayule and another kind of native plant rubber – *Eucommia ulmoides* gum, to reduce the shortage of NR. Rubber or tire

giants, like Lanxess, Goodyear etc, have already successfully synthesized some biobased conventional rubbers (BCRs), such as biobased isoprene rubber and biobased EPDM. In addition, a series of bio-based engineering elastomers (BEEs) have been developed by our group. The most promising examples were biobased itaconate rubber and biobased copolyester rubber, and the first 1000 tons/per year scaled production line will be constructed in Jinshan district, Shanghai, China.

BCRs and BEEs will soon be accepted by the global rubber industry if their prices become more close to SR. But SNRs are facing some technological problems, such as the rubber content and the output per acre of Russian dandelion are not high enough to support their large-scale industrial process set-up. At last, some encouraging policies, such as setting a binding application ratio of biorubber in tire industry, should be promulgated to accelerate the global use of biorubber which will in turn effectively reduce the carbon emissions and make the contribution to curb global warming.

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