Highly efficient method to synthesize ultra-high molecular weight polyisoprene rubber

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Branched ultra-high molecular weight polydiene rubbers possess remarkable mechanical properties, such as high tensile strength, high wet-slip resistance, and high damping performance. They are applied in high-performance tires and noise-reducing materials.

However, efficient and precise synthetic approach of the ultra-high molecular weight rubber is still a thorny subject, which limits its preparations and applications.

Recently, a research group led by Prof. Wang Qinggang from the Qingdao Institute of Bioenergy and Bioprocess Technology (QIBEBT) of the Chinese Academy of Sciences proposed a highly efficient strategy to synthesize ultra-high molecular weight branched polyisoprene rubber, utilizing a novel asymmetric binuclear chlorinated bridge iron catalyst.

The study was published in *Chemical Communications* on June 24.

The chloride-bridged unsymmetrical complexes consisted of mixed Fe(II)-HS/Fe(II)-LS binuclear structures, and exhibited extremely high catalytic efficiency, with 1 g catalyst being enough to produce 30 Kg polyisoprene rubber (Mn = 1.8×10^6 g/mol).

The resulting polyisoprene rubber had superior green strength and elongation at break, showing potential industrial application prospects.

More information: Liang Wang et al. An unsymmetrical binuclear iminopyridine-iron complex and its catalytic isoprene polymerization, *Chemical Communications* (2020). DOI: 10.1039/D0CC04122J

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