

Synthesis Process and Microstructure Characterization of Accelerator CBS by Mixed Oxidation Method

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Abstract: The mixed oxidation synthesis process of N-cyclohexyl-2-benzothiazolesulfonamide (accelerator CBS) was studied, and the microstructure of the reaction product was analyzed by various analysis methods such as Fourier infrared spectroscopy. The accelerator CBS was synthesized by firstly mixing 2-mercaptobenzothiazole (accelerator MBT) and cyclohexylamine, and then oxidizing the mixture by using mixed oxidation process with green composite oxidant. The optimum process conditions for synthesizing accelerator CBS were as follows: the molar ratio of the accelerator MBT/cyclohexylamine/composite oxidant/water was 1/2.3/1.2/45, the mixing temperature was 40~50 °C, and the time for pulping and salt formation was 40 min. The molar ratio of new cyclohexylamine/recovered cyclohexylamine was 1/1.2. The experimental results showed that the purity of the obtained accelerator CBS was 99.8% and the yield was 95% under the optimum process conditions. Using the mixed oxidation process to prepare accelerator CBS could solve the problems of high salt content in wastewater from the sodium hypochlorite oxidation method and low yield from the hydrogen peroxide oxidation method. In the process, cyclohexylamine was recycled. This process was a green process with industrial application value.

Key words: accelerator CBS; 2-mercaptobenzothiazole; cyclohexylamine; mixed oxidation process

铁系枝化丁戊橡胶创制技术获奖

日前,由中国科学院青岛能源所申报、巴陵石化等单位参与的“铁系枝化丁戊橡胶创制关键技术研究”项目荣获第二届“率先杯”未来技术创新大赛最高奖项——决赛优胜奖。

该项目针对我国合成橡胶依赖进口和石化下游C₄—C₅烯烃转化的重大需求,由中国科学院青岛能源所与巴陵石化公司、山东玲珑轮胎股份有限公司、青岛森麒麟轮胎股份有限公司、山东昊华轮胎有限公司等合作,发展了铁系枝化丁戊橡胶新材料的创制、合成与应用技术。

据介绍,该项目通过设计合成新型铁系金属络合物催化剂,创制铁系枝化丁戊橡胶新材料,研发出高效、高选择性的催化剂技术和催化聚合技

术,以及枝化丁戊橡胶微观结构的精准构筑与调控技术。研究团队还突破工程化放大若干技术难题,实现了铁系枝化丁戊橡胶百吨级间歇聚合和连续聚合中试放大试验,万吨级产业化示范项目也正在运行。他们还通过研究枝化丁戊橡胶微观结构与宏观性能之间的构效关系,构建其抗湿滑性、滚动阻力和耐磨性能之间的平衡关系,突破其在高性能轮胎胎面胶方面的应用关键技术,获得高性能抗湿滑胎面用橡胶新材料,有望形成变革性技术产品,解决溶聚丁苯橡胶关键技术难题。铁系枝化丁戊橡胶轮胎的抗湿滑性能达到欧盟标准A级,缩短了汽车的制动距离。目前项目正在建设年产100万条高性能轮胎制造示范线。

(摘自《中国化工报》,2022-12-09)

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