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Structure and Property of NBR Nanocomposites Filled with Cocamidopropyl Betaine Modified Organoclays

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Abstract: In this study, clay was modified by cocamidopropyl betaine (CAB), and modified clays/NBR nanocomposites were prepared. The structure and properties of the nanocomposites were investigated. The results showed that, the interlayer spacing of clay increased after modification, the molecular chains of NBR were intercalated into the gallery space of clay, and the organic clay was dispersed in rubber matrix at nano-scale. As the addition level of CAB increased, the dispersion of clay was improved, the filler network of the composite enhanced, the hardness, tensile strength, elongation at break and tear strength of the composites increased, and the modulus changed little. When the mole ratio of cation exchange capacity of organic clay to CAB was 1∶5, the reinforcement effect of modified clay on NBR was the best, and better than that of organoclay I. 30P and I. 44P.

Key words: clay; cocamidopropyl betaine; NBR; nanocomposite

废橡胶利用“十三五”致力绿色化

中图分类号:X783.3 **文献标志码**:D

绿色转型将成为废橡胶综合利用行业“十三五”的一个重要目标,实现这一目标的关键是提高废橡胶利用价值,优化产品结构,通过自主创新研发并推广新的再生工艺装备。这是 2015 年 7 月 7—10 日在浙江天台召开的 2015 全国首届废橡胶绿色应用现场会上传出的信息。

中国橡胶工业协会废橡胶综合利用分会秘书长曹庆鑫表示,工艺绿色化是废橡胶行业实现绿色转型的根本途径。工艺绿色化主要包括 3 个方面:一是用连续常压工艺替代间歇式动态脱硫工艺,二是通过标准提升等推进煤焦油淘汰进程,三是捏炼等工艺环节实现自动化。

中国橡胶工业协会名誉会长范仁德表示,再生胶行业面临的最大问题是劳动生产率低和二次污染尚未完全解决。行业应该走智能制造之路,建立再生胶及胶粉全封闭、自动化、绿色化生产线,将设备、产品、工艺、原材料、物流等集成在一起,改变传统而单一的生产模式,全面提高产品的精度和质量以及生产效率和智能化程度。

废橡胶综合利用行业绿色转型已初步具备条件。脱硫关键工艺方面,采用常压连续脱硫工艺与设备,再生胶产品达到了动态脱硫工艺产品质量,且脱硫环节不产生废水、废气,生产安全水平提升。废橡胶资源化、无害化、智能化螺杆挤出再生新工艺已列入石化行业环境保护与清洁生产重点支撑技术。在工艺自动化方面,自动称量下片机的开发为生产线智能化管理、配备机器人奠定了基础。

目前,加速解决再生橡胶生产二次污染问题已经成为行业的共识,并引起企业高度重视。淘汰“小三件”、改变轮胎粉碎工艺,改变工艺配方、淘汰煤焦油,改变高温高压脱硫工艺、采用常压连续脱硫工艺,将是废橡胶综合利用行业实现低碳绿色转化的重要手段。

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