

Properties of NR/Carbon Black Composites Modified by ENR

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Abstract: The influence of the content of ENR on the processability, dynamic mechanical properties and physical properties of NR/carbon black composites were investigated. It was found that the processability of the composites was improved by adding appropriate amount of ENR. ENR acted as a compatibilizer in the composites, the dispersion of carbon black in rubber matrix was improved, the bound rubber content increased, and the dynamic mechanical properties, physical properties and aging resistance of the vulcanizates were improved. When the addition level of ENR was 3~4.5 phr, the NR/carbon black composites possessed the best comprehensive properties. The test results by RPA and DMA indicated that, the wet skid resistance of NR/carbon black composites could be significantly improved with ENR, but the rolling resistance increased only slightly.

Key words: ENR; NR; carbon black; modification; property

“吃”地沟油原料“添”改性新功能 ——集成工艺“升值”橡胶隔离剂

中图分类号: TQ330.38⁺7 文献标志码: D

2014年2月8日从青岛科技大学传出消息,殷树梅教授研发的新型环境友好型功能化橡胶隔离剂集成生产工艺在青岛一化工企业完成一年的试生产,产品各项指标均达到橡胶隔离剂要求。这种新一代功能型液体隔离剂产品以地沟油为主要原料,通过化学改性及颗粒原位处理包覆转化新工艺,赋予了传统隔离剂产品改性的新功能。

据了解,这种新型橡胶隔离剂具有优异的隔离效果,在应用过程中无粉尘,不腐蚀设备,不含有毒物质,且对硫化后橡胶制品的性能有一定提升作用。

橡胶隔离剂是橡胶加工中的一类操作型助剂,隔离剂本身与橡胶的互容性差异较大,当胶片浸涂了隔离剂后,胶片之间形成一层薄薄的隔离层,其主要作用是防止胶片或半成品表面的相互粘结,常用于生胶和胶料的塑炼、混炼、压片及成型等操作工序。

随着我国橡胶工业的不断发展,橡胶隔离剂也不断更新换代,先后出现了硅橡胶、滑石粉、皂

类隔离剂和粉状隔离剂等四代隔离剂。但硅橡胶隔离剂产品毒性大,滑石粉隔离剂粉尘污染严重,皂类隔离剂易凝固,粉状隔离剂使用时有粉尘且成本较高,不能满足大中型橡胶制品企业清洁生产工艺的需求。殷树梅教授带领团队在深入研究橡胶连续化生产技术与工程实践的基础上,提出了环境友好型功能化橡胶隔离剂的集成生产工艺和关键技术。

这一技术是将地沟油去除杂质后,加入催化剂,使其主要成分脂肪酸酯在一定温度下反应转化为水溶性脂肪酸盐,再添加润滑剂、表面活性剂、偶联剂等助剂,然后利用此活性基团对有机高分子颗粒进行包覆,从而得到水溶性橡胶隔离剂。通过这种工艺使隔离剂的隔离性能显著提高,并且通过改性使橡胶性能也有一定提升,从而具有更高的应用价值。

从2011年下半年起,橡胶制品企业出于清洁生产的需求,已逐渐减少甚至停止使用粉尘污染较大的以滑石粉为原料的橡胶隔离剂,因此环境友好型橡胶隔离剂的市场需求将越来越大,市场前景广阔。

(摘自《中国化工报》,2014-02-10)