

Effect of Composite Flame Retardant on Properties of Brominated Butyl Rubber

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Abstract: The effect of antimony trioxide/aluminum hydroxide/decabromodiphenylethane composite flame retardant on the properties of brominated butyl rubber (BIIR) compound was studied. The results showed that the optimal ratio of antimony trioxide/aluminum hydroxide/decabromodiphenylethane was 30/25/15. As the vulcanization temperature increased, the Mooney viscosity of BIIR compound with different amounts of composite flame retardants increased, the t_{90} decreased, and the crosslinking degree increased. When the amount of composite flame retardant was 35 phr and the vulcanization temperature was 143 °C, the vulcanization characteristics, mechanical properties and aging resistance of BIIR compound were better, and the flame retardant level reached UL-94V-0, which met the product requirements.

Key words: BIIR; composite flame retardant; mechanical property; aging resistance; flame retardant property

胎侧质量和尺寸波动问题解决措施

我公司生产某规格胎侧时经常出现质量偏大或偏小、关键测量点尺寸不合格的情况,对轮胎质量和尺寸稳定性等产生影响。

1 原因分析

(1) 胎侧终口型开型比与整体胶料的压力不匹配,当胶料变化后挤出压力随之发生变化。

(2) 胎侧胶由2个工厂生产,各密炼机混炼工艺和效果存在差异,胶料在挤出过程中的流动性和膨胀系数发生变化。

(3) 生产设备故障等影响整体胎侧的收缩。

结合现场情况,最主要的影响因素是终口型开型比不匹配,故以此为突破口采取解决措施。

2 解决措施

(1) 重新确定新口型开型比。为保证挤出压力的稳定性及增强整体胶料流动到终口型处的增压效果,尽量减少胶料波动时所带来的压力变化,使胎侧胶的膨胀率不受到影响,新口型各关键点的实际开型尺寸都进行了减小处理。

(2) 为配合采用新口型开型比后整体压力的波动,控制压力稳定,调整挤出机的各螺杆转速,

$\Phi 250$, $\Phi 200$ 和 $\Phi 150$ 挤出机的螺杆转速分别由6.5, 6.8和12.0 $r \cdot \min^{-1}$ 调整为6.5, 8.0和11.0 $r \cdot \min^{-1}$ 。

3 改进效果

(1) 以标准总宽度为350 mm的胎侧为例,采取措施前测量的总宽度最大值为354.95 mm,最小值为345.25 mm;采取措施后总宽度最大值为354.49 mm,最小值为350.24 mm,总宽度波动减小。同样,测得关键测量点胎侧厚度波动减小。

(2) 采取措施前,胎侧质量基本上在中值以上波动;采取措施后胎侧质量基本上在中值上下波动,波动幅度减小。

(3) 采取措施前,生产5 404条胎侧,返回不合格胎侧条数为285条,返回率为5.27%;采取措施后,生产5 481条胎侧,返回不合格胎侧条数为194条,返回率为3.54%,胎侧质量明显提高。

(4) 采取措施前,轮胎质量波动 $\pm 1\%$ 以内合格率为95.06%,波动 $\pm 0.5\%$ 以内合格率为72.52%;采取措施后,轮胎质量波动 $\pm 1\%$ 以内合格率为95.13%,波动 $\pm 0.5\%$ 以内合格率为79.23%,轮胎质量合格率提升。

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