分。Banbury 密炼机剪切应力大于 0.16 MPa 的区域为 0.85%,而 Roller 密炼机为 0.4%。过大的剪切应力容易使胶料局部温度过高,导致一些易降解聚合物降解,应适当避免。

4 结论

使用 VOF 方法准确模拟了 Banbury 和 Roller 密炼机部分充满状态下自由界面的运动形态,并对两种密炼机的流场性能进行对比。通过分析得到以下结论。

(1)由于 Roller 转子的转子棱更多,流场内高压区更大,胶料受到最大剪切应力的作用更加频繁,两转子间的交换速度更快,有利于添加剂的分散。

(2)混合指数的对比表明,Banbury 密炼机承受更多优于简单剪切的剪切和拉伸流动,但需要更大的扭矩输入。

(3)综合评价,Roller 转子对添加剂的分散和分布优于 Banbury 转子。

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收稿日期:2014-09-19

Numerical Simulation of Compound Flow Field in Partially Filled Internal Mixer with Different Rotor Configuration

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Abstract: The 2D compound flow field in partially filled Banbury and Roller internal mixer at constant temperature was simulated by using the package Fluent. The results showed that, the melt in the Roller internal mixer experienced maximum shear stress more frequently, the exchange between the two rotors was more intense, and the flow field became more complicated. The average mixing index of the Banbury internal mixer was slightly larger, but the torque input to operate the machine was higher.

Key words: Banbury internal mixer; Roller internal mixer; partially filled; flow field; numerical simulation

含纳米填料的充气轮胎气密层组合物

中图分类号:TQ330.38^{+}3;TQ336.1 **文献标志码**:D

由特拓(青岛)轮胎技术有限公司申请的专利(公开号 CN 104262701A,公开日期 2015-01-07)“含纳米填料的充气轮胎气密层组合物”,涉及的含纳米填料的气密层胶料配方为:生胶 100,炭黑 30~60,纳米粘土 5~30,环烷油 5~15,氧化锌 1~4,硬脂酸 1~2,增粘树脂 3~8,硫黄 1~2,噻唑类促进剂 1~2。本发明在基本不影响胶料物理性能的前提下,提高了充气轮胎气密层的气密性,同时降低了胶料成本。

(本刊编辑部 马 晓)