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Study on Interaction between Carbon Black N234 and Rubber by Infrared Spectroscopy

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Abstract: The interaction between carbon black N234 and the rubber was studied by infrared spectroscopy (IR). The red shift (shift to low wavenumber) of group characteristic peak of the rubber with different dosages of carbon black N234 was observed. The results showed that with the addition of carbon black N234, the IR characteristic peaks of natural rubber (NR), solution polymerized styrene-butadiene rubber (SSBR), emulsion polymerized styrene butadiene rubber (ESBR) and butadiene rubber (BR) all presented a red shift in different degrees. Due to the strong interaction between carbon black N234 and NR, the red shift degree of methylene group characteristic peak of NR was the largest. With the increase of carbon black N234 amount, the red shift degrees of different group characteristic peaks of rubber were different, and the interaction between different groups of rubber and carbon black N234 was different. The red shift degree was not affected by the blending of rubbers. With the addition of carbon black N234, the red shift results of group characteristic peaks of the vulcanized blends were the same as the unvulcanized ones.

Key words: Infrared spectroscopy; carbon black N234; natural rubber; styrene butadiene rubber; butadiene rubber; interaction; red shift; characteristic peak

万吨级氢化苯乙烯/异戊二烯共聚物 成套技术通过验收

中图分类号: TQ334.3 文献标志码: D

2017年12月5日, 由中国石油化工集团公司巴陵石化公司和北京化工研究院联合承担的“万吨级氢化苯乙烯/异戊二烯共聚物(SEPS)成套技术开发”项目通过中国石化科技部组织的技术鉴定。专家组认为, 该项目整体技术与产品质量达到国际先进水平, 生产技术和产品填补了国内空白, 具有显著的经济效益和社会效益。SEPS主要用作光纤光缆油膏和润滑油粘度指数改进剂以及运动器械、防护用品、线材等的弹性体。

该项目开发了万吨级SEPS成套技术并完成了工业应用试验。已投产的3个牌号SEPS产品中, SEPSYH-4010和YH-4020主要用作光纤光缆油膏, 具有优良的触变性以及适宜的粘度和耐高、低

温性能; SEP-4051主要用作高性能弹性体, 具有拉伸强度大、弹性好、透明度高等特点。该项目的SEPS产品性能与国外同类产品相当, 部分指标甚至优于国外同类产品。该项目已获得发明专利授权7项, 形成专有技术7项。

2017年8月, 年产2万t的SEPS工业化装置在巴陵石化合成橡胶事业部建成投产, 结束了我国不能生产SEPS的历史, 巴陵石化也由此成为全球第3家SEPS生产商。目前, 该装置运行平稳, 能耗、工艺指标和安全环保性能均符合要求, 产品质量合格。

我国光纤光缆油膏对SEPS的年需求量超过8 000 t, SEPS类润滑油粘度指数改进剂需求量超过1万t, SEPS用作弹性体的年需求量超过2万t, 而此前SEPS全部依赖进口。2016年我国SEPS消费量已超过2万t, 预计5年内我国SEPS的年消费量可达到5万t, SEPS市场前景良好。

(钱伯章)