表 2 约束条件下预测最优损耗因子及对应各因子的水平

迭代次数	因子(用量/份)					优化目标	约束条件	
	天然橡胶	丁苯橡胶	顺丁橡胶	白炭黑	炭黑	损耗因子	邵尔A型硬度/度	300%定伸应力/MPa
1	64.4	19.6	39.7	29.4	23.4	0.100 8	68.2	12.42
30	70.5	26.3	35.7	32.1	25.9	0.095 3	67.6	11.32
60	71.3	27.5	34.7	32.9	26.4	0.093 7	65.5	11.32
90	72.4	28.1	33.5	34.6	26.9	0.093 1	65.2	11.32
100	72.4	28.1	33.5	33.6	26.9	0.093 1	65.0	11.32

表 3 约束条件下预测最优损耗因子与试验结果对比

项 目	试验值	预测值	相对误差/%
损耗因子	0.087 0	0.093 1	7.0
邵尔A型硬度/度	62	65	4.8
300%定伸应力/MPa	12.8	11.32	11.6

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收稿日期:2012-11-28

Application of Computer-aided Design in Optimization on Loss Factor of Tread Compound

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Abstract: Latin-Hypercube simulation was carried out by using the test data from the designed experiments of tread compound. Then support vector machine was used to build the models of loss factor,hardness and modulus at 300% elongation,respectively, where the loss factor was optimization objective, and hardness and modulus at 300% elongation were applied as the constraint conditions. The approximate optimal value of loss factor under these constraint conditions was obtained by genetic algorithm. The experimental results were in good agreement with the simulated results,which demonstrated that the simulation method was effective and could be put into practical use.

Key words: tire; tread compound; loss factor; support vector machine; genetic algorithm

超支化膨胀阻燃橡胶材料及其制备方法

中图分类号:TQ332;TQ333 **文献标志码**:D

由上海工程技术大学申请的专利(公开号CN 101899175A,公开日期 2010-12-01)“超支化膨胀阻燃橡胶材料及其制备方法”,涉及的超支化膨胀阻燃橡胶材料配方为:橡胶(天然橡胶、三元乙丙橡胶、丁苯橡胶或丁腈橡胶中的1种以上) 100,超支化膨胀型阻燃剂 60~80,氧化锌 3~5,硬脂酸 1~2,防老剂4010NA 2~4,硫化剂 3~4,促进剂M 1~2,促进剂D 0.3~0.5。超支化膨胀型阻燃剂与橡胶的相容性大幅提高,其优良的界面相容效应使阻燃橡胶材料的物理性能明显提高,同时阻燃效果提高。

(本刊编辑部 赵 敏)