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Study on Properties of Nitrile Rubber Composite Reinforced by Short Fiber

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Abstract：In this study，several types of short fibers were applied in nitrile rubber（NBR） composite by replacing part of the carbon black and the effect on the properties of compound was investigated. The testing results showed that the F_L and F_{max} values of the compound with non-polar polyester short fiber were lower，while those values of the compound with rigid aramid short fiber were higher. Compared with the compound without short fiber，the t_{10} of the compound with short fiber was prolonged，Mooney viscosity was lower，hardness of the vulcanizate was higher， and the tensile modulus at 300% elongation and tensile strength were lower. The tensile strength and elongation at break of the compound along the vertical direction of fiber orientation were lower than those of compound along the direction of fiber orientation， respectively. The fiber orientation degree，stiffness and hardness of the short fiber filled compound decreased in the order of aramid short fiber，polyester short fiber，polyamide fiber and cellulose short fiber. Aramid short fiber filled compound showed good tear resistance and polyester short fiber filled compound possessed the best overall performance. It was also found that short fiber filled compound tended to yield under stress and short fiber generated stress concentration causing material failure.

Key words：short fiber；cellulose；polyamide；polyester；aramid；nitrile rubber；orientation；yield

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（黄丽萍）