



Influence of Carbon Black/Silica Hybrid Ratio on Properties of Passenger Car Tire Sidewall

Typically, a car tyre consists of many components, including tread, belt plies, inner liner, beads and sidewall. Apart from the tyre tread, the tyre sidewall is one of the critical tyre components because it helps absorb the shock generated by hitting road bumps and, thus, provides ride comfort. Also, the sidewall offers lateral stability and protection of the body plies. The most desirable properties of tyre sidewall are high resistance to flex cracking and low heat build-up. The sidewall compounds are, therefore, mostly made from natural rubber (NR) and butadiene rubber (BR) blends filled with reinforcing fillers.

This work presents the use of hybrid filler technology for improving crucial properties of the tyre sidewall compounds. The influence of carbon black (CB)/precipitated silica (SiO₂) hybrid ratio on the properties of a passenger car tyre (PCT) sidewall based on the NR/BR blend was investigated. Results show the enhanced rubber–filler interaction with increasing silica fraction leading to the improvement in many vulcanisate properties, including hardness, tensile strength, tear strength and fatigue resistance, at the expense of cure efficiency and hysteretic behaviours (i.e., reduced heat build-up resistance and increased dynamic set).

Associated SDG goals are Industry, innovation and infrastructure (9), and Responsible consumption and production (12).

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Reference

A. Limtrakul, Sae-Oui, P., Nillawong, M., **Sirisinha, C.** "Influence of Carbon Black/Silica Hybrid Ratio on Properties of Passenger Car Tire Sidewall", Periodica Polytechnica Chemical Engineering, 2022, 66(1), 147-156.

