



Property Investigation of Ready-to-Use Silica-Filled Rubber Composites Containing a Curing Agent Prepared by a Simple Latex Compounding Method

A silica-filled rubber compound containing a curing agent was successfully prepared using a latex compounding method, followed by coagulation with calcium chloride. This process led to low silica loss (around 1–5% by weight). The compounds were milled at various levels (10–40 passes) and tested for rheological and mechanical properties. As milling increased, viscosity decreased due to rubber breakdown (mastication) and better silica dispersion. In highly filled samples (30–50 phr), the Payne effect, which indicates filler-filler interaction, dropped by nearly 50% from 10 to 40 passes, confirming improved dispersion. However, without silica surface treatment, the silica network tended to reform at high temperatures, especially in heavily filled compounds. Despite this, better dispersion resulted in significant gains in tensile strength and elongation at break (both exceeding 30%), while hardness decreased slightly (by 10–15%).

Overall, this method yields robust silica-filled rubber compounds without requiring expensive silane agents or high-shear mixers..

The associated SDG goal is Responsible consumption and production (12).

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Reference:

Boonsomwong, K., Saeoui, P., **Sirisinha, C.**, Property investigation of ready-to-use silica-filled rubber composites containing a curing agent prepared by a simple latex compounding method, Industrial Crops and Products. 2024, 222, 119502.

