EFFECT OF SUPERIOR PROCESSING RUBBER ON THE PROCESSABILITY AND MECHANICAL PROPERTIES OF PA80/SBR BLENDS

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The superior processing rubber (PA80) can be blended with synthetic rubbers to achieve the desired degree of processing advantages in extrusion applications. In the present study, PA80 in different proportions was blended with a medium viscosity grade styrene butadiene rubber (SBR) and their processability and physicomechanical properties were evaluated to identify an ideal blend proportion with optimum properties suitable for extrusion. In the proposed PA80/SBR blends, the optimum crosslinking was achieved with a semi-efficient vulcanization system and the cure rate was found to increase proportionally with PA80 content. Moreover, the Mooney viscosity, tensile strength, 100 per cent modulus, hardness, crosslink density and carbon black dispersion also improved with PA80 content. In contrast, the retention in tensile properties after thermal ageing, abrasion resistance index and compression set properties were found to be better with blends having higher SBR content. However, the appearance and contours of the extrudate shapes produced from the blends had a smoother surface with a lower die swell than the control. Therefore, in extruded products, 30-50 per cent replacement of SBR with PA80 is recommended without significant property reduction.

Keywords: Die swell, Extrusion, PA80, Processability, SBR, Superior processing rubber

INTRODUCTION

Synthetic rubbers (SR) offer a comprehensive spectrum of properties essentially required for a large range of rubber products. The exceptional stability/durability to resist harsh environmental conditions made them dominant in aerospace, automotive, healthcare, military, electronics, consumer goods and others where natural rubber (NR) fails. SRs are broadly classified into general purpose and special purpose grades.

Styrene butadiene rubber (SBR) is a general-purpose synthetic elastomer explored popularly in the tyre industry because it possesses excellent abrasion resistance, wet skid resistance, resistance to flex fatigue and supports higher filler loading to serve long-run performance (Takino *et al*., 1997). The SBR is one of the highest-volume synthetic elastomers produced globally and is mainly consumed in conveyor belts, moulded shoe soles and heels, waterproof materials, drive couplings, automotive parts, adhesives and other moulded and extruded rubber goods. It has certain drawbacks like inferior mechanical properties, poor oil, thermal and ozone resistance.

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