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BLENDS AND COMPOSITES OF NATURAL RUBBER AND EPDM RUBBER WITH POLAR RUBBERS

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Recent developments in polymer blends and composites from non-polar/polar rubbers are reviewed in this article. Blending of elastomers is frequently used to enhance the performance/processing characteristics of rubber compounds. Many of the elastomer blends are characterized by a two-phase morphology, narrow interface, and poor physical and chemical interactions across the phase boundaries resulting in poor mechanical properties. To overcome this, compatibilizers and reactive blending are generally used which improve the interfacial adhesion and reduce the coalescence between non-polar/polar rubbers. These blend systems are immiscible and the compounding ingredients are nonuniformly distributed in two phases depending on their affinity, rate of diffusion and reactivity to different components.

Keywords: Composites, EPDM rubber, Polar rubbers, Rubber blends

INTRODUCTION

Initially synthetic rubbers, like styrene-butadiene rubber (SBR) and butadiene rubber (BR), were introduced as counterparts for natural rubber (NR) during World Wars I and II. Normally, synthetic rubbers provide inferior mechanical properties compared to NR due to the lack of strain-crystallization. Synthetic rubbers, like nitrile rubber (NBR), ethylene-propylene rubber (EPM and EPDM) and chlorinated polyethylene (CM) are widely used for their special properties, such as better ageing, ozone, oil and heat resistance. Along with the developments in synthetic rubbers, new vulcanization systems were also designed to achieve proper vulcanization with good properties.

Blending or mixing of two or more elastomers is carried out for three main reasons: improvement of the technological properties of an elastomer, for better processing behavior and for reducing the compound cost. Blending is thus a method of obtaining optimum properties and performance at a reasonable cost, if the technical properties are satisfied.

Mixtures and blends occur at different hierarchical scales in the material range employed in the rubber industry. Composite products such as tyres, hoses, beltings and air springs are composed of metal wire, textile cord and elastomeric compounds which form a rubber matrix. The rubber matrix itself may be a mixture of elastomers, fillers and plasticizers.

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