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## **REINFORCEMENT OF NATURAL RUBBER USING POLYMERIC FILLERS**

The present finding relates to a process of preparing natural rubber (NR) vulcanisates reinforced with polymeric fillers that give excellent mechanical and dynamic properties.

### **INTRODUCTION**

Carbon black and silica are used to reinforce rubber to manufacture rubber products. Generally dynamic properties like hysteresis loss is higher for carbon black filled system than silica filled system. At the same time, silica filler has a comparatively lower abrasion resistance and modulus in rubber vulcanisates than carbon black. Both these fillers have high specific gravity and therefore weight to volume ratio is high. So it will be desirable to find a filler which gives excellent reinforcing characteristics of carbon black and dynamic properties of silica. Polymeric fillers is a class of materials that offer both of these requirements.

### **SUMMARY**

The polymeric fillers are incorporated in natural rubber under suitable conditions. This rubber compound is further processed in the conventional way. On incorporation of lower proportions of the polymeric fillers in NR under suitable processing conditions, the mechanical properties of the vulcanisates get improved to the extent equivalent to the carbon black filled NR vulcanisates.

### **MAIN OBSERVATIONS**

The polymeric filler reinforced NR vulcanisates exhibit performance similar to carbon black filled NR based vulcanisates in terms of tensile properties, hardness, compression set and ageing resistance and at the same time show performance much superior to the carbon black filled NR vulcanisates in terms of dynamic response; rebound, heat build-up, Payne effect,  $\tan \delta$  at 60<sup>0</sup>C and flex cracking initiation and flex crack failure. This combination of properties could lead to lower fuel consumption and higher mileage which is a much sought after combination of requirements by the truck tyre manufacturing industry. Thanks to the superior reinforcing efficiency of the polymeric fillers, it needs only to use 10 – 12 phr of the same in place of 30-60 phr of carbon black or silica usually used to reinforce rubber. The rubber compounds containing the polymeric filler also offer the additional advantages of (i) weight reduction since the polymeric filler is significantly less dense than carbon black and other mineral fillers used in rubber industry and (ii) there is no need to use aromatic polycyclic oils or any other mineral or vegetable oils to aid the dispersion of the filler or to reduce the viscosity of the rubber compound.

### **CONCLUSION**

Thus the present discovery offers a method to prepare rubber compositions for the manufacture of NR based rubber products currently manufactured using carbon black or silica or any other mineral fillers, like auto mobile tires and especially tire treads and tire side walls, cycle tires and other non-tire products like conveyer belts, microcellular sheets, floor mats and other NR based moulded rubber articles.