NATURAL RUBBER ANALOGUES OF STYRENE - DIENE THERMOPLASTIC RUBBER

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Graft copolymers of polystyrene on natural rubber and other polydiene backbones can be prepared by direct dry mixing of the rubber with polystyrene prepolymers carrying a single terminal azodicarboxylate functional group. Chemical combination of the rubber backbone and the polystyrene prepolymers occurs via an ene reaction of the terminal azodicarboxylate functional group with the polydiene. The efficiency of grafting can be very high based on the polystyrene functionality.

Grafting efficiency is also dependent on the grade of natural rubber used and can be increased by pretreating the rubber with certain additives. An oil dispersion of calcium oxide at 3 - 6% on rubber was found to be very effective in improving the grafting efficiency.

The graft copolymers show many of the general physical characteristics of styrene - diene thermoplastic rubbers and, at appropriate compositions, show comparable properties to styrene - diens block copolymers. The physical properties are dependent upon the proportion of polystyrene in the graft copolymer and on the molecular weight of the plystyrenc prepolymer. Like the block copoiymers, these graft copolymers can be compounded with other ingredients using similar processing techniques and can be moulded into finished products without vulcanisation.

The preparation of graft copolymers by dry mixing will be described in some detail in the paper. Granulation of the graft copolymers and preliminary work carried out on compounding will also be described. The melt flow characteristics of the graft copolymer and their compounded mixes will also be briefly discussed.

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