

# ULTRASOUND DEVULCANIZATION OF SULFUR VULCANIZED SBR: CROSSLINK DENSITY AND MOLECULAR MOBILITY

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## ABSTRACT

Sulfur-cured SBR vulcanizates are devulcanized by high power ultrasonic irradiation in a continuous process under various processing conditions. Crosslink density and gel fraction of devulcanized rubber are measured. The unique dependence of crosslink density on gel fraction of devulcanized samples obtained at various processing conditions is established. DSC studies indicate a significant increase in the glass transition temperature of the devulcanized rubber having crosslink density lower than that of the original vulcanizates. Solid state NMR studies confirm that these changes in  $T_g$  are due to a decrease of molecular mobility as measured by a decrease in spin-spin relaxation time. Ultrasonic devulcanization is accompanied by a significant increase in *cis-trans* isomerization. Chemical changes explaining the observed phenomena are discussed.