

Abstract Submitted
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Effect of Carbon-Black Filler and Processing Oil on Ultrasound Devulcanization of Isoprene Rubber¹ ERNST VON MEERWALL, XIMEI SUN, TIRTHA JOSHI, AVRAAM ISAYEV, Univ. Akron — In support of a novel approach to rubber recycling, we continue our investigation of the effects of intense ultrasound on isoprene rubber by studying molecular and segmental mobilities of the host rubber vulcanized in the presence of 35 phr carbon-black filler with and without 10 phr plasticizing processing oil. We measured wide-line transverse NMR relaxation (T_2). The magnetization decays followed a bimodal distribution, distinguishing physical and chemical network (short T_2) from lighter sol, dangling chain ends, and trace oligomers (long T_2). Pulsed-gradient diffusion measurements failed because the high melt molecular weight contained insufficient longer- T_2 sol components. It was found that, corrected for oil where present, chemically extractable sol fractions were reduced to about 2/3 of those in unfilled vulcanizates at equal ultrasound exposure. Black filler modestly decreased all segmental mobilities, whereas processing oil slightly increased them. This relative insensitivity to additives supports earlier conclusions that the efficiency of the ultrasound method is uncompromised by the solid filler and extender oils used in rubber-based industrial products.

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