

Abstract Submitted
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Entanglement in Fullerene End-Capped Linear Polymers XI-
AORONG WANG, YUAN-YONG YAN, Bridgestone Americas, Center for Research and Technology, Ohio, Akron — We studied the viscoelastic behavior of fullerene (C60) end-capped linear polymers, such as the C60-polybutadiene and C60-poly(butadiene-co-styrene). Those polymers were synthesized through anionic polymerization of butadiene and styrene in hexane, where the living ends were capped with the C60 via an epoxybutane bridging. Rheological measurements showed that for polymer chains of one end attached with C60, the polymer dynamics in the terminal zone were profoundly affected by the presence of fullerene, while the dynamics in the entanglement plateau were nearly unaffected; whereas for polymer chains of two ends attached with two C60, the polymer dynamics in the entanglement plateau were profoundly affected by the presence of fullerene, while the dynamics in the terminal zone were less affected. Given that the diameter for a “reptation-tube” is about 5nm, but the diameter for a C60 buckball is only about 0.7 nm, can this phenomenon be explained by the existing reptation models?

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