

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

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 polymer-
ization 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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Date submitted: 25 Oct 2006

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