Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Tensile Properties and Hysteresis Behavior of Graft Copolymers with Complex Molecular Architecture R. WEIDISCH, Institute of Materials Science and Technology, Friedrich-Schiller-University Jena, Loebdergraben 32, D-07743 Jena, Germany , U. STAUDINGER, Leibniz-Institute of Polymer Research Dresden, Germany, Y. ZHU, S.P. GIDO, Polymer Science and Engineering Dept., University of Massachusetts, Amherst, USA, D. UHRIG, J.W. MAYS, Chemical Sciences Division and Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, Oak Ridge,TN 37831, USA, N. HADJICHRISTIDIS, H. IATROU, Department of Chemistry, University of Athens, Greece — PS-PI multigraft copolymers with tri- tetra- and hexafunctional polystyrene branch points have been studied to investigate the influence of molecular architecture on tensile properties and hysteresis behaviour. It was found that mechanical properties are mainly controlled by functionality of the graft copolymers and the number of branch points per molecule. Tetrafunctional multigraft copolymers show surprising high strain at break values up to 1550 %. With increasing number of branch points strain at break and tensile strength increase, where a linear dependence of mechanical properties on the number of branch points is obvious. Hysteresis experiments have proved excellent elasticity of tetra and hexafunctional multigrafts far exceeding that of commercial elastomers like Styroflex. A tetrafunctional multigraft copolymer can be deformed till 1400 % showing a residual strain of only 40 % demonstrating super elastic property profile.

Roland Weidisch
Institute of Materials Science and Technology,
Friedrich-Schiller-University Jena, Loebdergraben 32, D-07743 Jena, Germany

Date submitted: 03 Dec 2005 Electronic form version 1.4