Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Development of Polythiophene/Acrylonitrile-Butadiene Rubbers for Artificial Muscle PACHARAVALEE THIPDECH, ANUVAT SIRIVAT, Chulalongkorn University — Electroactive polymers (EAPs) can respond to the applied electrical field by an extension or a retraction. In this work, we are interested in using an elastomeric blend for electroactive applications, acrylonitirle-butadiene rubber (NBR) containing a conductive polymer (Poly(3-thiopheneacetic acid, PTAA); the latter can be synthesized via oxidative polymerization. FT-IR, Thermogravimetric analysis (TGA), ^{1}H-NMR, UV-visible spectroscopy, and SEM are used to characterize the conductive polymer. Electrorheological properties are measured and investigated in terms of acrylonitrile content, blending ratio, doping level, and temperature. Experiments are carried out under oscillatory shear mode and with applied electric field strength varying from 0 to 2 kV/mm. Dielectric properties, conductivities are measured and correlated with the storage modulus responses. The storage modulus sensitivity, $\frac{\Delta G'}{G'_0}$of the pure rubbers increases with increasing electric field strength. They attain the maximum values of about 30% and become constant at electric strength at and above 1000 V/mm.

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Date submitted: 09 Nov 2006 Electronic form version 1.4