CHAPTER V
CONCLUSIONS

In this study, electrorheological properties, dielectric properties, electrical conductivity of Acrylonitrile-butadiene rubber and Poly(3-thiopheneacetic acid)/Acrylonitrile-butadiene rubber, P3TAA/NBR, blends were investigated. The conductive polymer was synthesized via oxidative polymerization. The electrorheological properties were investigated under applied electric field strength from 0 to 2 kV/mm, at fixed temperature of 27 °C. For the effect of acrylonitrile content of pure NBR, the storage modulus responses ($\Delta G'$) increasing electric field strength around 0.7 order magnitude. With increasing ACN, $\Delta G'$ slightly increases by attaining around 44%. The particle concentrations of P3TAA were also investigated. From the characterization results, these systems are immiscible blend. The storage modulus response of the blends increases with particle concentration and electric field strength around 0.3 order magnitude. The dielectric results show that dielectric constant and dielectric loss increase with particle concentration. From these results the data can be plotted the correlation between the storage modulus response and dielectric constant. In pure system, the modulus linearly increases with dielectric constant consistent with Perline's equation whereas the blends systems which the storage modulus responses ($\Delta G'$) nonlinearly increases with increasing dielectric constant.

For the temporal response, both systems are irreversible systems because they have remaining dipole interaction in the systems when the electric field is turned off.

The bending response was observed by calculating from bending angle and electric force. In pure rubber system (NBR1), the response and force increase linearly with electric field. For the blend system, the response and the force are nonlinear with electric field.