In order to study the transport properties of individual helical polyacetylene fiber, we developed a method to extract single fiber from tightly entangled ropes of helical PA bulk film. AFM images show that extracted helical PA fibers are typically 10 μm in length, 100 - 200 nm in diameter and the helicity of bulk materials is conserved. We present the temperature dependencies of current-voltage characteristics of individual helical PA fiber doped with iodine. This possible transport mechanism between our results and theories for tunneling in 1D system is discussed.

Ep-086 Interaction Between Two Nonuniform and Flexible Bio-Interfaces

One of fundamental interactions between charged bio-interfaces is the Coulomb interaction. The Coulomb interaction at nano-scale is different from that in a conventional scale due to proximity between charged particles. The attraction between two uniformly charged surfaces with same sign has been well known in a strongly coupled system. However surface charges in a real biological system are not uniformly distributed but rather discretely. We have found that the non-uniformity makes a stronger correlation of bulk counter ions to surface charges and induces stronger attractive pressure between two interfaces. Furthermore we have investigated the effect of the bio-interface flexibility on the pressure between two interfaces as a function of coupling parameter and distance for a large coupling parameter. Surface flexibility allows the surface ions to respond to counter ions. As a consequence, surface reforms to minimize total energy. Numerical simulations and theoretical analysis will be presented.

Ep-087 Growth and interfacial effect of double wall nanotubes of conducting polymer and magnetic Ni

One of the most important issues for the application of nanotubes is the growth and interfacial effects. In this work, we investigated the growth of double wall nanotubes on Ni and the effects of Ni on the electrical properties of the nanotubes. The results show that the growth of double wall nanotubes is influenced by the Ni concentration and that the electrical properties of the nanotubes are affected by the interfacial effects between the Ni and the nanotubes.

Ep-088 Charge carrier mobility in MEH-PPV / Fullerene blends studied by time-of-flight method

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The poly2-methoxy, 5-(2'-ethyl-hexyloxy)-p-phenylene-vinylene (MEH-PPV) is a hole transporting material. To raise its electron mobility, we have blended the polymers with fullerene (C60) which is an electron transporting material. The ratio of MEH-PPV/C60 blend ranges from 0.2 wt.% to 1 wt.%. We have performed time-of-flight (TOF) and current-voltage (I-V) measurements. The electron mobility gradually increased with the weight percentage of fullerene. The Poole-Frenkel model shows that the increase of the weight percentage of fullerene lowers the activation energy at zero-field, which suggests that fullerene possibly decreases the trapping impurities.

Ep-089 Electron mobility tuning by blending MEH-PPV conjugate polymers with single-walled carbon nanotubes

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We report on the effects of blending MEH-PPV conjugate polymers with single-walled carbon nanotubes (SWNTs). MEH-PPV is a hole transporting material in which the high density of the electron traps such as oxygen impurities and conjugational defects inhibits the electron transport. As it has been demonstrated that the SWNTs are efficient oxygen capturing materials, blending MEH-PPV with SWNTs could possibly decrease the oxygen trap density and thus increase the electron mobility, which initiated the present study. The blending ratio of MEH-PPV/SWNTs composites in this work ranged from 0 wt. % to 1 wt. % SWNTs. From time-of-flight (TOF) measurements, we observed that the electron mobility gradually increased with the weight percentage of SWNTs.