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Nanomorphology of the interface between P3HT and SWNT KATSUHIKO NISHIMRA, MIKIYA FUJII, RYOTA JONO, KOICHI YAMASHITA, School of Engineering, The University of Tokyo — Organic bulk-heterojunction photovoltaic devices are promising as energy harvesting device because of their mass-productivity, and shorter energy pay back time compared to silicon based solar cells. Poly-3-HexylThiophene (P3HT) and Phenyl C_{61} Butyrate Metyl (PCBM) are an early successful material pair and yield high IPCE of 60% to 80%. Instead of PCBM, Single Walled carbon Nanotubes (SWNT) has also been examined as an electron acceptor material because SWNTs have good properties such as high carrier mobility, which ended with surprisingly low efficiency compared to P3HT and PCBM pair however. According to a recent study, the low efficiency is due to ultrafast recombination of the free carriers generated on the interface. Therefore, nanomorphology of the interface is important to inhibit the recombination of free carriers. We have computationally analyzed how the nanomorphology of the interface between P3HT and SWNT is formed and how molecular orbital or other molecular properties are affected by the morphology. We are going to report how side chains on P3HT effect the nanomorphology and electronic structure around the interface.

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