

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Self-Organized Single-Crystal Polythiophene Microwires KILWON CHO, Pohang University of Science and Technology, DO HWAN KIM, Pohang University of Science and Technology — Here we show a well-faceted, high-quality 1D single-crystal poly (3-hexylthiophene), P3HT microwire with unprecedented electrical characteristics such as a low resistance ($0.5 \text{ M}\Omega$), a channel current as high as $25 \mu\text{A}$, and a well-resolved gate modulation via solution growth. We find that 1D single-crystal P3HT microwires are formed spontaneously through facile self-assembly of individual polymer chains, adopting preferential well-ordered inter-chain stacking along the wire axis. Our findings indicate that π -conjugated polymer single-crystals are capable of very efficient charge transport. This approach could lead to the development of chemical and biological sensors which are efficiently capable of electrical and /or optical monitoring. This work was supported by the National Research Laboratory Program, a grant (F0004022) from Information Display R&D Center under the 21st Century Frontier R&D Program, the BK21 Program, and the Pohang Acceleratory Laboratory for providing the synchrotron radiation source at the 4C2, 3C2, and 8C1 beam lines.

Kilwon Cho
Pohang University of Science and Technology

Date submitted: 30 Nov 2005

Electronic form version 1.4