

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.

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Date submitted: 30 Nov 2005

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