

Abstract Submitted  
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**Organic field effect transistor fabricated by directly grown poly (3 hexylthiophene) crystalline nanowires on solution processed carbon nanotube aligned array electrodes** BIDDUT SARKER, Nanoscience Technology Center, Department of Physics, University of Central Florida, Orlando, FL 32826, JIANHUA LIU, LEI ZHAI, Nanoscience Technology Center, Department of Chemistry, University of Central Florida, Orlando, FL 32826, SAIFUL KHONDAKER, Nanoscience Technology Center, Department of Physics, and School of Electrical Engineering and Computer Science, University of Central Florida — We demonstrate convenient and highly reproducible approach to fabricate organic field effect transistors (OFETs) using the direct growth of crystalline P3HT nanowires on aligned array SWNT interdigitated electrodes. Compared to the OFETs with metal electrodes, the OFETs with SWNT electrodes show high mobility and high current on-off ratio with a maximum of  $0.13 \text{ cm}^2/\text{Vs}$  and  $3.1 \times 10^5$ , respectively. The improved device characteristics are also demonstrated by the absence of short channel effect which is dominant in gold electrode OFETs. Such remarkable improvement of the device performance as high mobility, high current on-off ratio, absence of short channel effect and better charge carrier injection can be attributed to the improved contact via strong  $\pi - \pi$  interaction SWNT electrodes with the crystalline P3HT nanowires as well as the improved morphology of P3HT due to one dimensional crystalline structure. .

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