Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Advances in Organic Single-Crystal Transistors ALEJANDRO L. BRISENO, Department of Chemistry, University of Washington, ZHENAN BAO, Department of Chemical Engineering,Stanford University, YOUNAN XIA, Department of Chemistry, SAMSON A. JENEKHE, Department of Chemical Engineering, University of Washington — Organic semiconductors, including conjugated small molecules and polymers, constitute next-generation materials for displays, circuits, and a vast array of other electronic applications. The performances of organic single-crystal transistors have recently surpassed the performance levels of amorphous silicon devices. Despite the high mobilities of single-crystal devices, there are many factors limiting their applications. Currently, single crystals are hand-picked and made into an individual device. Another challenge is to achieve control of crystallinity in polymer nanostructures. There is a need to explore nanowires as solution-processable materials because of the cost-effective aspect in fabricating devices. Therefore, in order to meet the requirements for fabricating practical devices, we have resolved the aforementioned issues by patterning organic single-crystal transistors and polymers. We have developed solution-phase methods for preparing organic single-crystal nanowires from p- and n-type semiconductors and highly oriented nanowires from polymer semiconductors. Furthermore, we have realized high-performance transistors and demonstrated the first all-polymer complementary circuit.

Alejandro L. Briseno
University of Washington

Date submitted: 02 Dec 2007 Electronic form version 1.4