Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

A bio-derived liquid crystal template for highly ordered semiconducting polymers BAILEY RISTEEN, JUNG OK PARK, MOHAN SRINIVASARAO, PAUL RUSSO, ELSA REICHMANIS, Georgia Institute of Technology — One main challenge in producing flexible organic electronic devices is ensuring adequate performance of the active semiconducting material. Spontaneous self-assembly of semiconducting and semicrystalline polymers yields undesirable amorphous aggregates that prevent effective charge-carrier transport. Polymer alignment by intra and interchain π-π stacking is crucial to achieving superior optoelectronic properties and high charge carrier mobility. In this work, the liquid crystal ordering of bio-derived cellulose nanocrystals (CNCs) was investigated as a means of enforcing long-range order in the semiconducting polymer poly[3-(potassium-4-butanoate) thiophene-2,5-diyl], PPBT. It was found that the inclusion of these renewable particles in PPBT solutions resulted in enhanced polymer chain alignment. Furthermore, the presence of anisotropic polymer aggregates and chain co-planarization was confirmed by UV-Vis and circular dichroism spectroscopy.

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Date submitted: 11 Nov 2016 Electronic form version 1.4