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Inducing crystallization of poly(3-hexylthiophene) nanowires by well-defined nucleation sites[1] DANIEL ACEVEDO-CARTAGENA, YUE ZHANG, University of Massachusetts Amherst, ELVIRA TRABANINO, None, ALEJANDRO BRISENO, RYAN HAYWARD, University of Massachusetts Amherst, RYAN HAYWARD TEAM, ALEJANDRO BRISENO COLLABORATION — Solution crystallization of conjugated polymers promises a facile way to fabricate nano-scale structures with desirable properties for improving organic-based electronic devices. The addition of well-defined nucleation sites to a supersaturated solution can induce crystallization and allow for control over structural features. We identified conditions when homogenous nucleation of a model semicrystalline polymer, poly(3-hexylthiophene), P3HT, is suppressed, allowing for controlled crystallization into nanowires upon addition of well-defined nucleation sites. The hysteresis window between crystallization and melting temperatures of P3HT nanowires is tuned using concentration, molecular weight of the polymer, and solvent quality. We show that in this manner short P3HT nanowires ("seeds") can be extended, though obtaining well controlled extension into linear structure remains an open challenge. In a similar fashion, graphene or graphite coated substrates were found to be excellent nucleating agents for growth of nanowire films.

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