

STRATEGIES FOR NANOSCALE SEGREGATED SEMICONDUCTOR ASSEMBLIES

Dhandapani Venkataraman, Serkan Yurt, Hari Venkatraman, Amarnath Bheemaraju, Travis Benanti, Thomas van der Poll and Antranig Kalaydjian
Department of Chemistry, University of Massachusetts Amherst
Amherst, MA 01003

It is a challenge to reliably assemble electron-rich and electron-poor π -conjugated moieties into nanoscale segregated morphologies for photovoltaic cells. Our group is pursuing general strategies, using tools of supramolecular chemistry to direct the packing of π -conjugated moieties into ordered segregated nanoscale morphologies. In one approach, we are pursuing the use of pairs of immiscible side chains to drive the assembly of diblock copolymers into segregated morphologies. For example, in poly(3-hexylthiophene) with pendant electron conductors that have fluorocarbon side-chains, the immiscibility of aliphatic hydrocarbon and aliphatic fluorocarbon chains drives the assembly into segregated morphologies. In this poster, we will present the synthetic protocols, structure and morphological characterization, and photovoltaic cell metrics for various polymers bearing incompatible side chains.

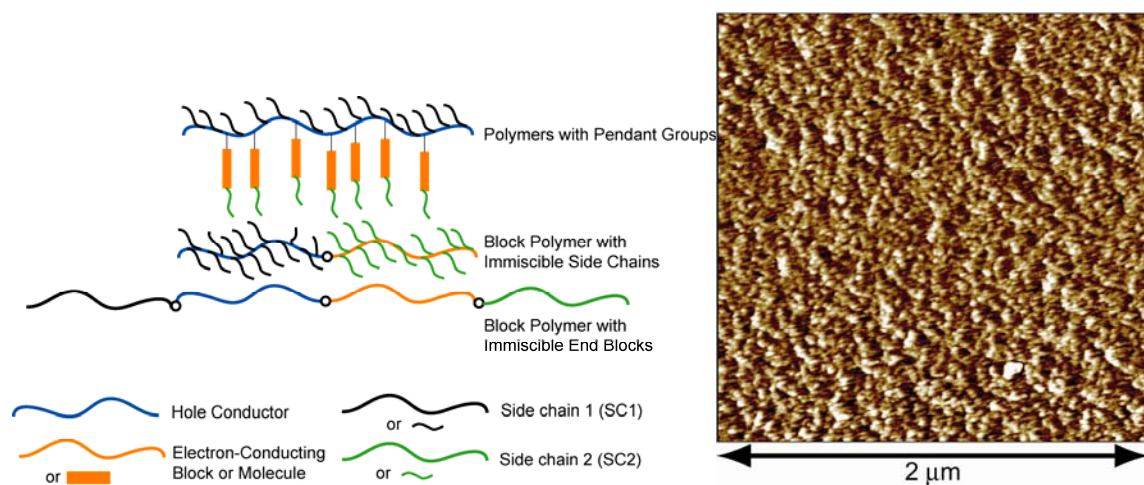


Figure 1: Illustration of the diblock copolymer architectures with immiscible side chains studied (left) and an AFM image of poly(3-hexylthiophene) with a pendant electron conductor (right).