Organic FETs

Beamline: U7A

Category of Researcher:
NIST PRT

Technique:
NEXAFS Spectroscopy

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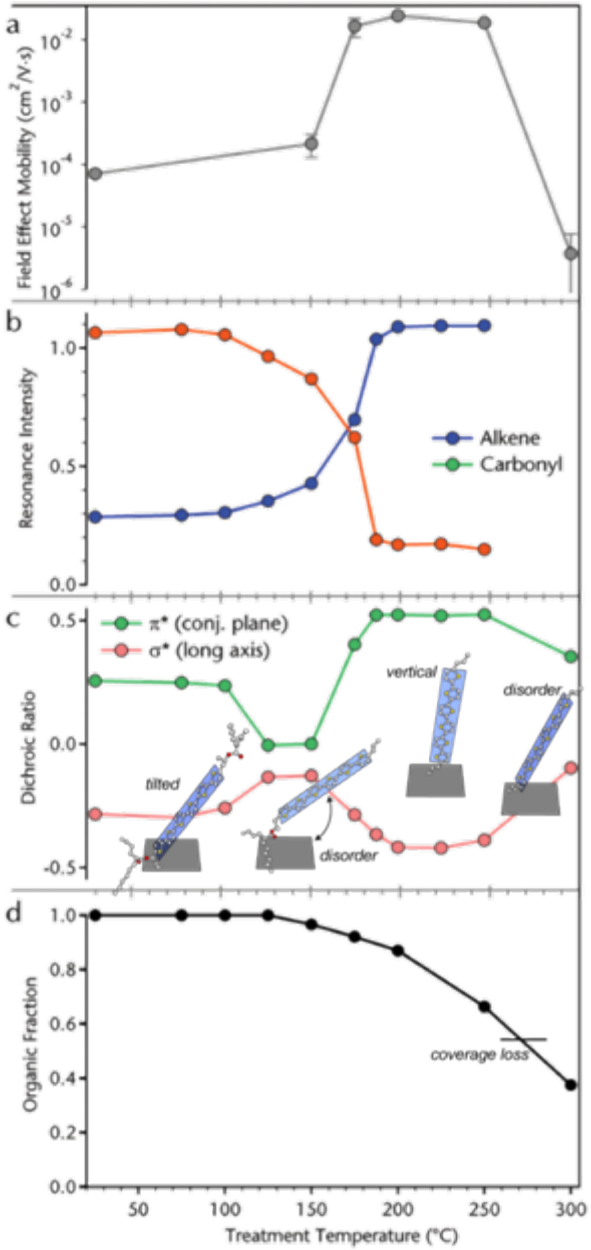
Publication: *Direct correlation of organic semiconductor film structure to field-effect mobility*. Advanced Materials 2005, 17 (19), p2340.

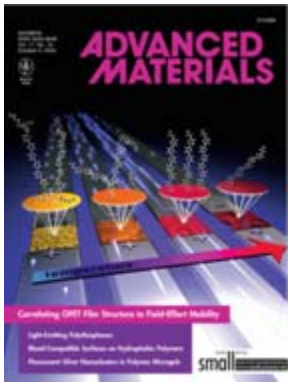
Motivation:

In organic semiconductors, structure and chemistry develop dynamically during processing, and can critically affect performance.

We develop clear correlations between treatment temperature, chemical conversion, molecular orientation, and transistor field-effect mobility for a soluble oligothiophene precursor.

Figure:
(a) performance
(b) conversion
(c) orientation
(d) coverage
…of a convertible oligothiophene.



Results:

NEXAFS spectroscopy provides simultaneous measurement of chemical conversion, molecular orientation, and film coverage for samples over conversion. The results clearly correlate to the development of field effect mobility in transistors. The optimal treatment temperature provides full conversion, vertical orientation with the best p-overlap, and full film coverage.