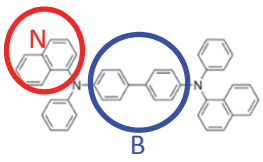
Molecular orientation analysis in organic thin films for OLED

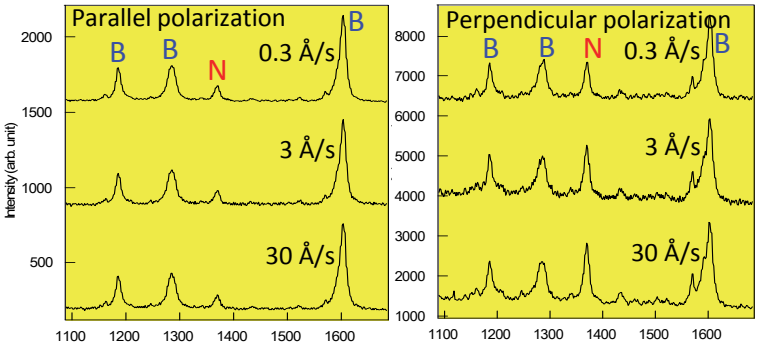
Raman and Angle resolved XAFS reveal molecular orientation in organic thin films. Using two modes of XAFS measurement, you can compare top surface vs. bulk of those films.

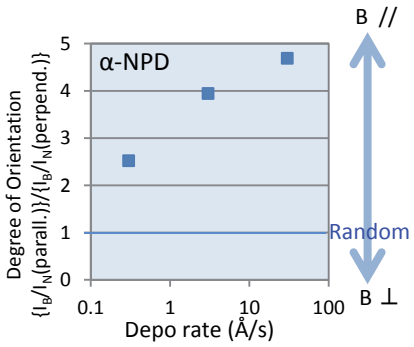
Samples: Organic films (α-NPD or Bphen, 200 nm) / ITO / Glass-sub. (Deposition rates : 0.3, 3, 30 Å/s)

1. Polarized Raman : Orientation of main chain

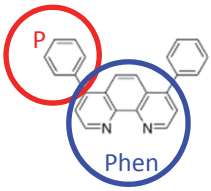
α-NPD

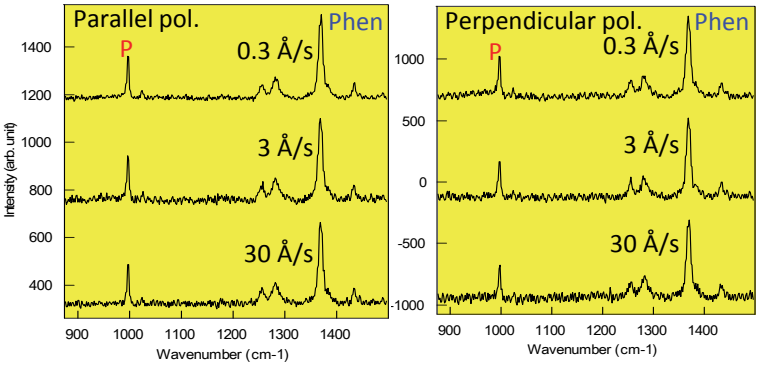


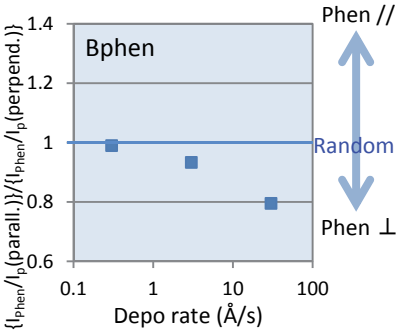




Bphen



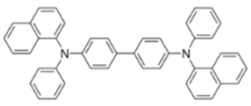


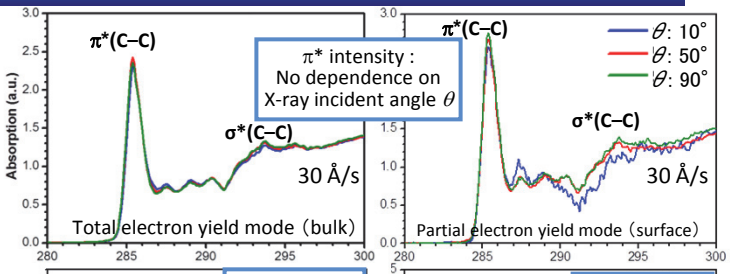


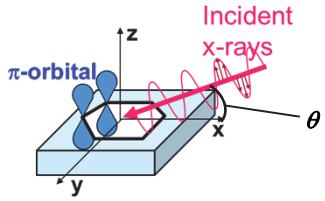
α-NPD	: Parallel orientation of biphenyl group to substrate
Bphen	: Week perpendicular orientation of phenanthroline group
Dep. Rate dependence	: Increase in orientation along with deposition rate
* Degree of orientation	= Ratio of normalized intensities of main chain band in parallel vs. perpendicular configuration

2. Angle resolved C K-edge XAFS : Orientation of π conjugated plane

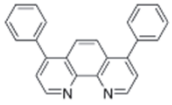
α-NPD

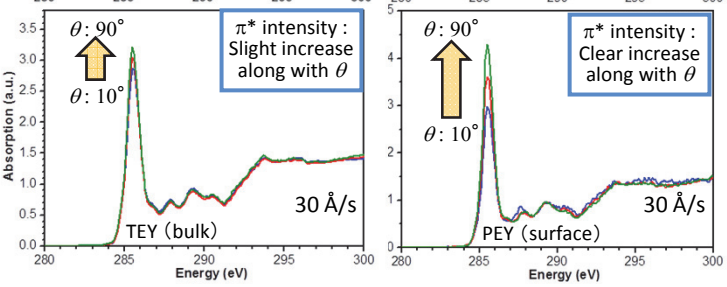


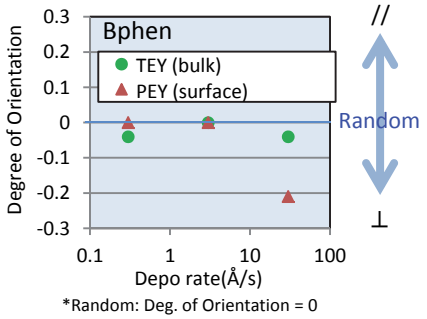




Bphen







*Random: Deg. of Orientation = 0

α-NPD	: Random both in bulk and at surface at all deposition rates
Bphen	: Top surface of the film of deposition rate of 30 Å/s shows clear orientation perpendicular to the substrate.