

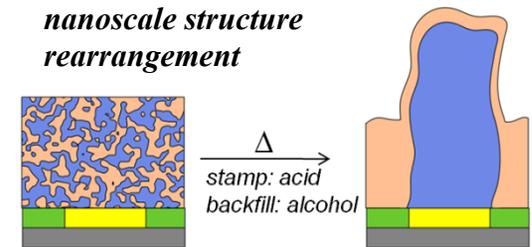
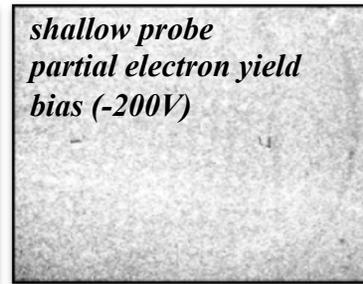
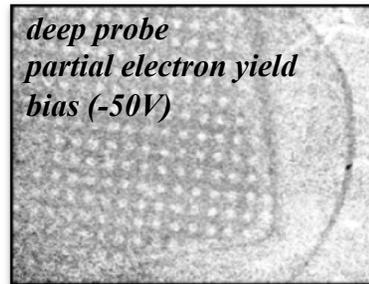
# Spectroscopy Soft and Tender (SST)

## SST at NSLS-II

- Structure function relationships in advanced materials, often at the nanoscale, for promoting innovation and enhancing US industrial competitiveness
- XPS Full Field Magnetic Projection Microscope: (3D) chemical mapping of the structure of nanomaterials and nanodevices at all points within their volume
- Large Area Full Field NEXAFS Microscope: highly efficient, depth selective, spectroscopic chemical and orientation maps of gradient samples, combinatorial arrays

## Examples of Science Areas & Impact

- BIOMATERIALS: Structure and chemistry sensitive imaging to enable development of next generation of biomedical arrays using high-throughput screening
- ORGANIC PHOTOVOLTAICS: Precise measurements of materials composition and molecular orientation with sub-100 nm spatial resolution
- MICROELECTRONICS: Imaging structure and chemistry of buried layers and interfaces of real device architectures towards ultimate CMOS Scaling



NIST's NEXAFS microscope (NSLS U7A) reveals the structure of an OPV film structured "by design" in collaboration with University of Washington (Ginger). Lighter areas are fullerene-rich; contrast is generated by split  $\pi^*$  resonance of fullerene.

## Beamline(s) Capabilities

**TECHNIQUE(S):** 6 unique world class NEXAFS/XPS experimental stations (2 full field microscopes, 2 automated high-throughput, and 2 in-situ high pressure)

**SOURCE:** canted undulator sources; (1) soft x-rays (100 eV - 2.2 keV) and (2) tender x-rays (1 - 7.5 keV)

**ENERGY RANGE / RESOLUTION:** continuous 100 eV to 7.5 keV (at two common focal points) /10,000

**SPATIAL RESOLUTION:** XPS microscope, 1nm; NEXAFS microscope, 1 $\mu$ m



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**NIST**  
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