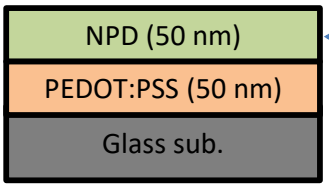
Impurity Analysis in Solution-processed OLED by TOF-SIMS

We performed depth profiling of impurities by GCIB-TOF-SIMS and detailed qualification of impurities by MS/MS in TOF-SIMS as comparison of OLED layers deposited by solution process and vacuum deposition process. Impurities on interface and surface were observed in solution-processed OLED.



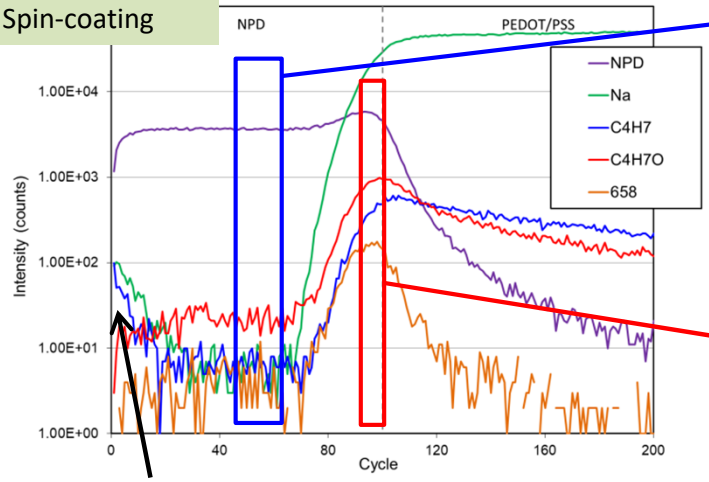
NPD deposition process
- Spin-coating with THF solvent
- Vacuum deposition

* Results in spin-coating sample is shown below. Comparison to vacuum deposition sample is discussed in summary.

* THF(tetrahydrofuran):

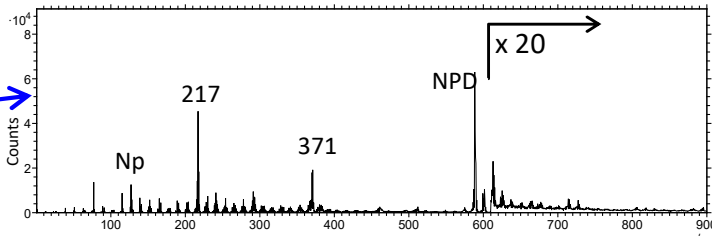
1. GCIB-TOF-SIMS depth profiling of impurities

Spin-coating

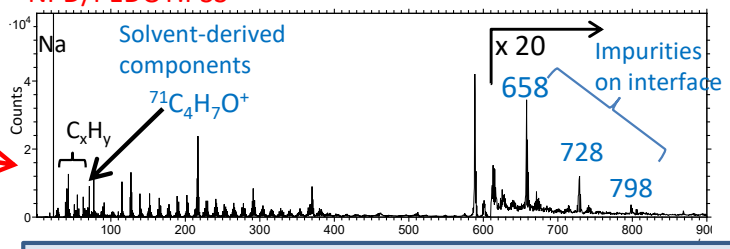


Na, Aliphatics on the surface

NPD layer



NPD/PEDOT:PSS



- Detection of solvent-derived components on interface and in NPD layer
- Detection of impurities on spin-coated samples

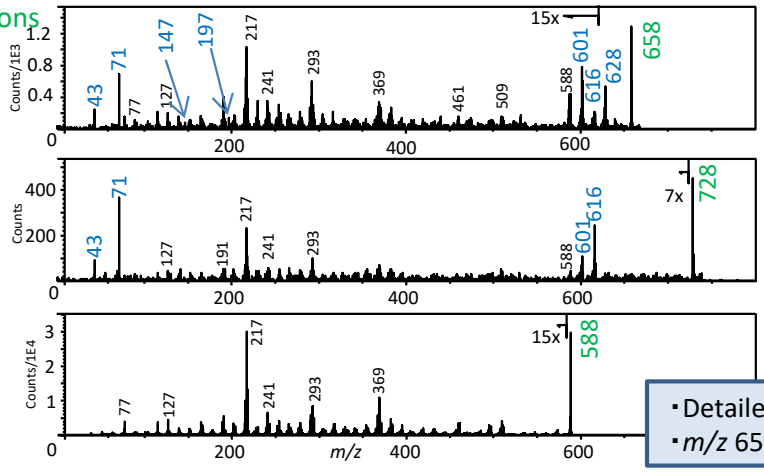
2. Qualification of impurities by MS/MS in TOF-SIMS

Precursor ions

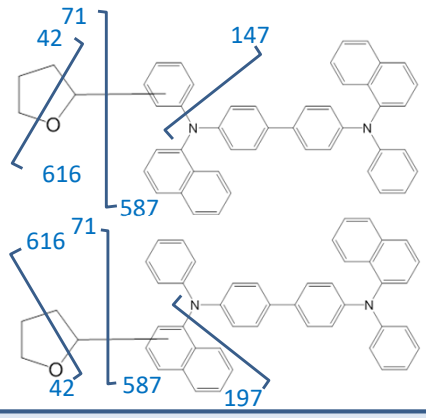
impurities *m/z* 658

m/z 728

NPD (reference) *m/z* 588

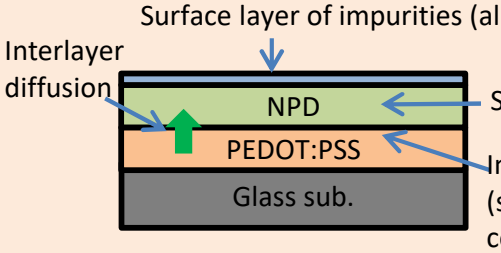


Assignment of peaks from *m/z* 658



- Detailed qualification of impurities
- *m/z* 658 : two type of "Solvent-adduct to NPD"

Features of "spin-coating" in comparison to "vacuum deposition"



- Solvent residue, impurities on interface and surface were observed in "spin-coating" by GCIB-TOF-SIMS.
  →Detailed qualification of impurities on interface by MS/MS in TOF-SIMS as 2nd step
- Spectroscopic ellipsometry, XRR observed difference of refractive index, high density on surface layer as shown in another document.
  →Integrated analysis by combination of techniques

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