

Reduced Viewing Angle Color Shift Defects via CVD Thickness Control

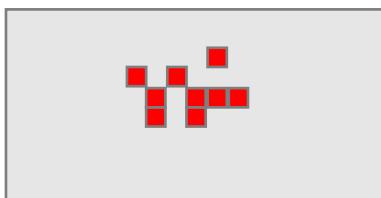
Problem

- Line-to-line defect rate variation
 - One OLED production line showed a **higher VACS defect rate** than others
- Inline vs. cell-level inspection discrepancy
 - While inline light-on inspection showed stable color coordinates, cell-level light-on inspection revealed a high defect rate

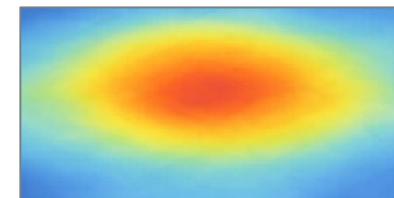


Investigation

- Chamber-to-chamber defect rate variation
 - Identified **CVD chamber-to-chamber variation** in VACS defect rates
- Defect vs CVD thickness map
 - Compared CVD thickness maps across chambers and correlated them with defect patterns



[Defect map]

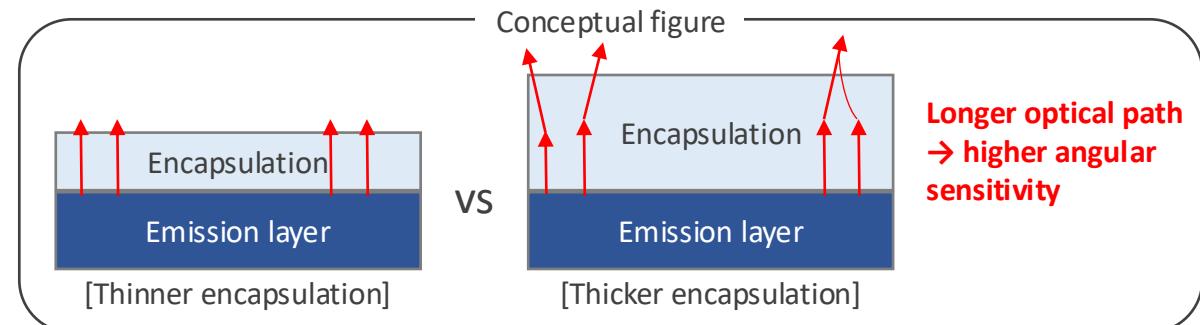


[CVD thickness map]

- Process sequence
 - CVD encapsulation occurs between inline and cell-level inspections

Hypothesis

- Optical path effect
 - Encapsulation thickness affects optical performance.



Verification

- CVD thickness DOE
 - Confirmed **higher VACS defect rates** with thicker encapsulation
- Inline vs. cell-level inspection consistency check
 - Confirmed improved alignment between inline and cell-level inspections

Action

- CVD thickness window optimization
 - **Optimized CVD thickness window** with related teams to minimize optical impact while maintaining encapsulation performance
- Chamber-to-chamber CVD thickness alignment
 - Implemented chamber-to-chamber thickness alignment to reduce VACS defect variation