

The art of prototyping

OPERA SOLUTIONS

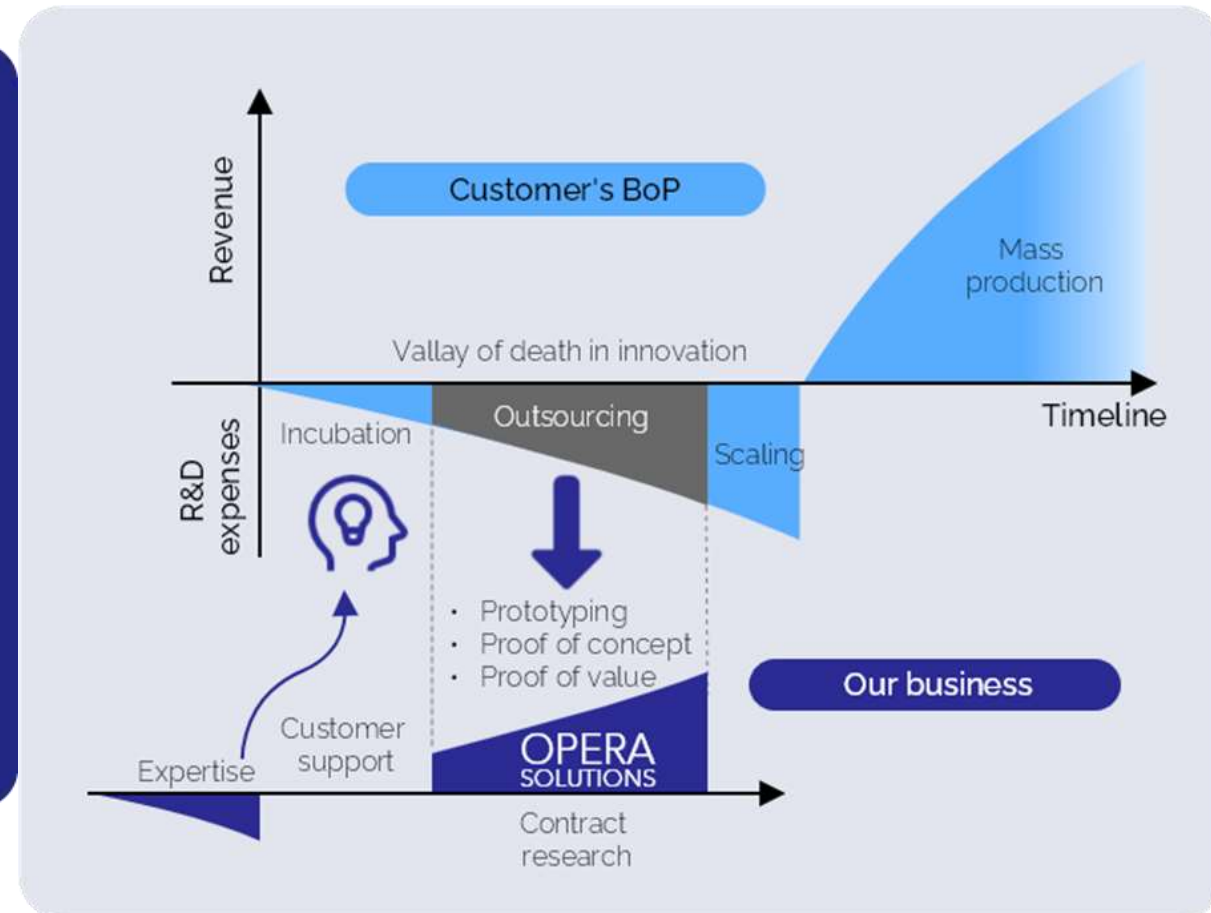
For proof-of-concept
and proof-of-value
requirements in industry



Value proposition to customers

Contract research to support electronics and semiconductor industry

- Delivering credible data for prototyping, proof-of-concept and proof-of-value requirements
- Accelerating customers' resource-efficient product development



Self-completion of fabrication and characterization of customized electronic device in-house

Process technology

- UV lithography
- Transparent electrode/oxide sputtering
- PE-CVD SiN

OLED architecture designs

- Top emission
- Optical simulations

Characterization and analysis

- Physical/chemical analysis
- Thin-film characterization
- Device characterization/lifetime measurement



Light distribution/
integrating sphere



OLED lifetime
measurement



Vacuum TG-DTA



Absolute PL quantum
yield spectrometer



RELIABILITY

Technologies for
reproducible OLED/QLED
performance



QUALITY

High-performance
reference OLEDs



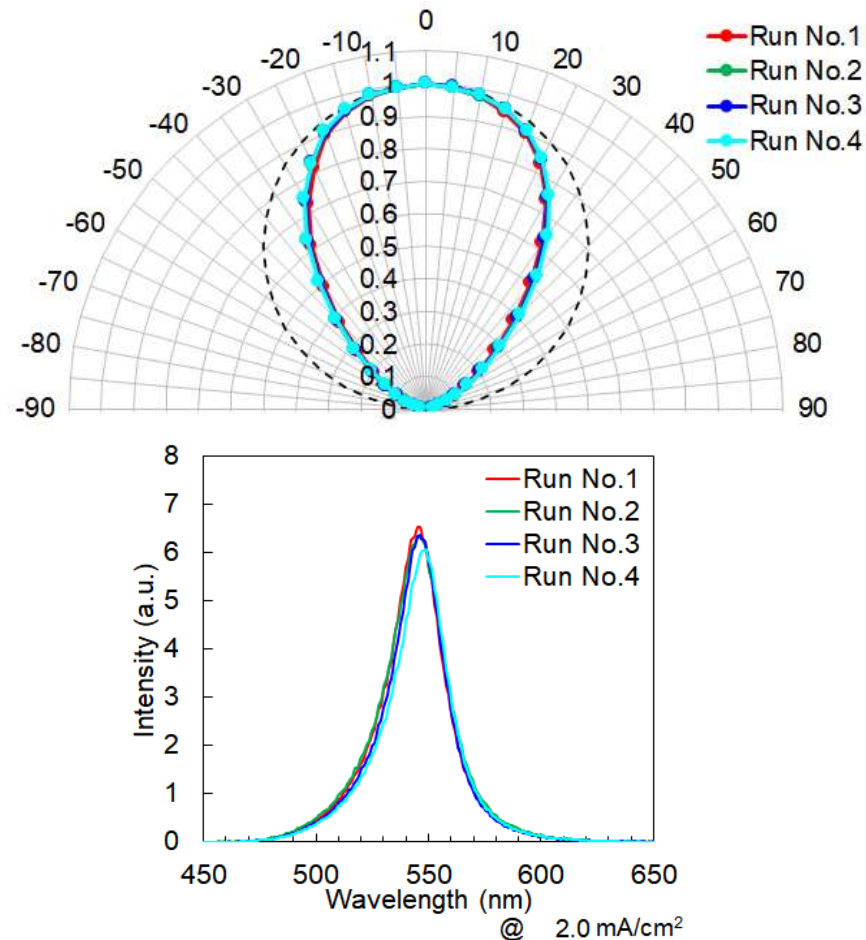
CLEANLINESS

Investigation of the
influence of killer impurities
on organic devices

OLED and QLED baseline technologies

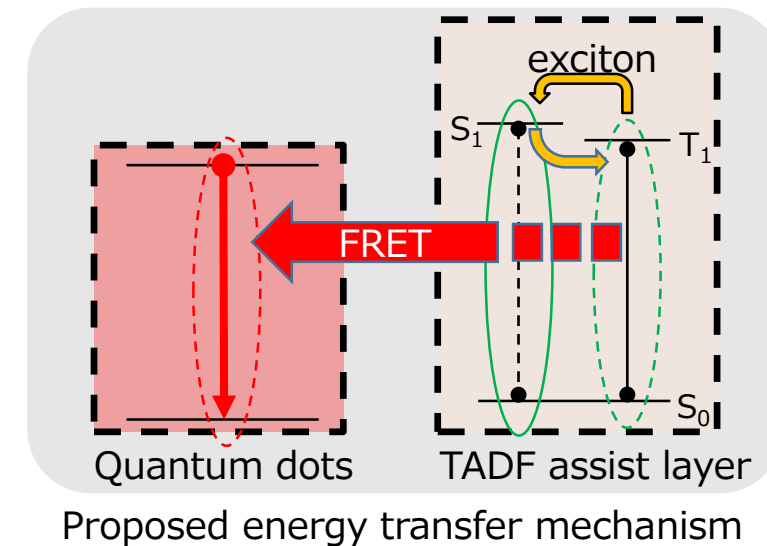
Top-emission characterization

Small variation in run-to-run performances



Demonstrating an efficient cadmium-free QLED

A TADF-assist layer successfully doubles the EQE



MORE

H. W. Mo, K. Harada, H. Miyazaki, C. Adachi, *SID Digest of Technical Papers* **51**, 870-873 (2020)

Barrier and 3D semiconductor processes

We undertake prototyping and proof-of-concept of your next-generation devices

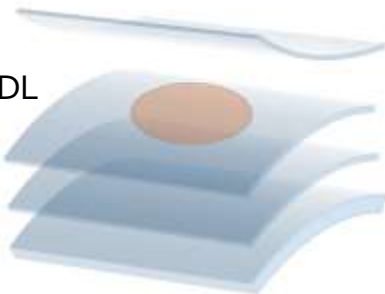
Flexible/wearable device demonstration

CVD-SiN
Thin-film encapsulation

Bank/PDL

Barrier

Flexible substrate



Customized device fabrication & evaluation

TEG fabrication for
proof-of-concept

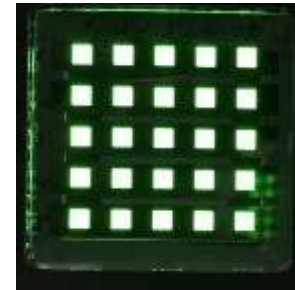
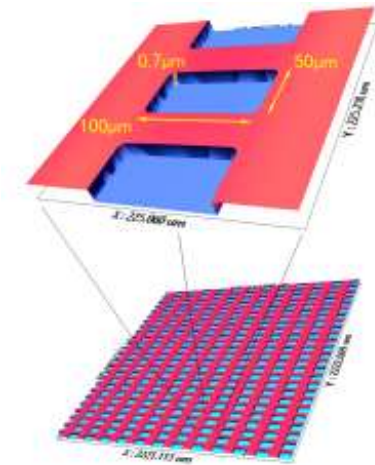
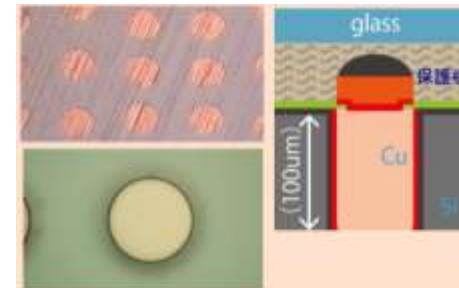


Photo-lithographic
micro-patterning



2.5D/3D packaging by TSV,
interposer, etc.



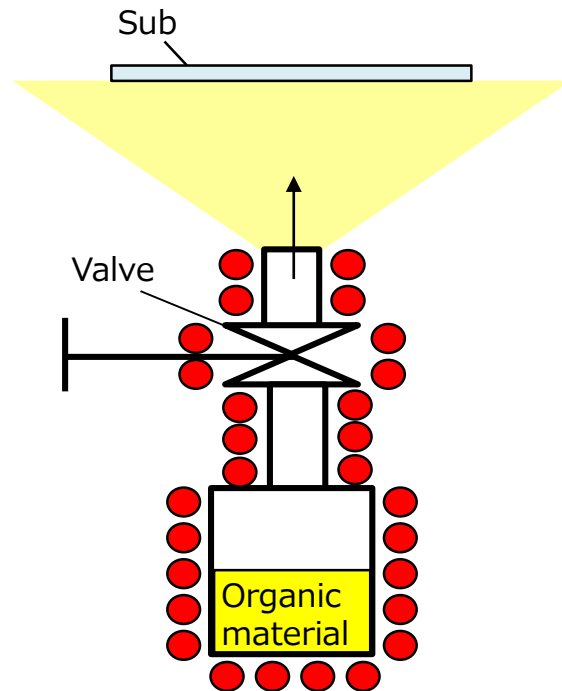
<http://www.itoshima-3dsemi.com/development.html>

Customized experiments

Long-term VTE test under a high vapor pressure mimicking a linear source

Time series sampling of deposited films and residues

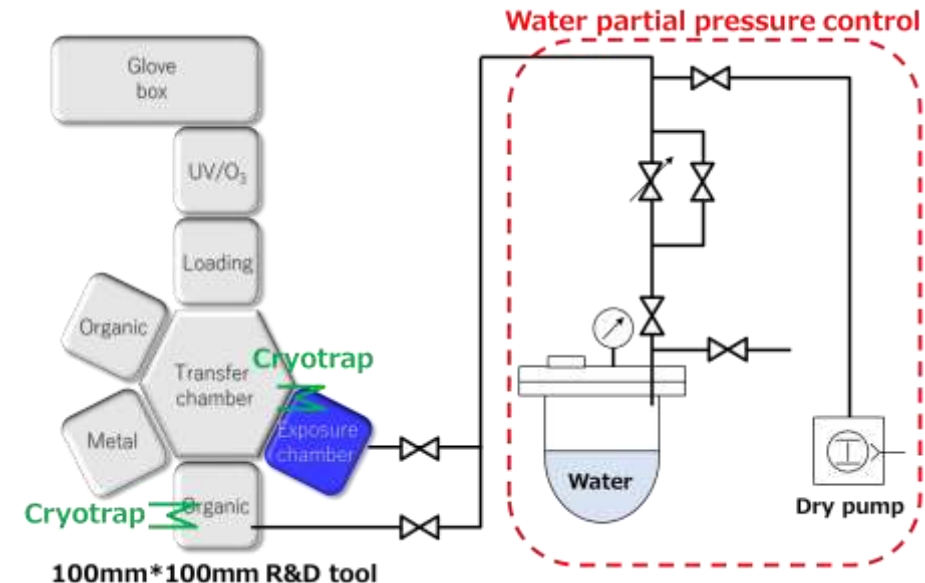
- Useful for e.g. evaluation of mix-host ratio stability



Deliberate in-situ exposure of impurities/water during OLED fabrication

Our customized system reveals:

- whether the impurity is a killer or not, and
- whether a specific organic interface is susceptible to the influence.



MORE

Rossa Mac Ciarnáin, Hin Wai Mo, Kaori Nagayoshi, Hiroshi Fujimoto, Kentaro Harada, Tung-Huei Ke, Paul Heremans and Chihaya Adachi, *SID 2021 Digest of Technical Papers* **52**, 1477 (2021).

Our offerings to customers

Customers

Advanced electronics ventures

Consumer electronics makers

Equipment manufacturers

OLED/QD materials suppliers

Functional materials suppliers; adhesive, filler, barrier, bank and flexible sheet, etc.

Your demands

Prototyping next wave of technologies

Seeking for specs of next generation displays

Proof-of-concept of an innovative display fabrication process

Proof-of-value of your materials to meet panel maker demands

Proof-of-value of your products toward display mass-production

We respond to your demands

■ Model-making, fabrication and ex-ante evaluation of cutting edges such as QLED, micro-OLED and perovskite devices.

■ TEG fabrication & evaluation of top-emission OLED architectures.

■ Micro-patterning of customized device by utilizing photolithography & 3D semiconductor processes

■ Long-run VTE tests of your materials.

■ Customized device lifetime experiments to identify degradation issues of your materials.

■ We incorporate your products into our state-of-the-art test devices, compare with reference devices and give you the verification data.



Prototyping



Proof of concept



Proof of value



OPERA SOLUTIONS

imagination to stay ahead

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