



Introduction of INTREE Co., LTD.

2024.09.26



INTREE Overview



**INTREE is the abbreviation of Integrated Nanotechnology Tree
And it means the materials and components industry such as display
and solar panel based on Nano materials.**

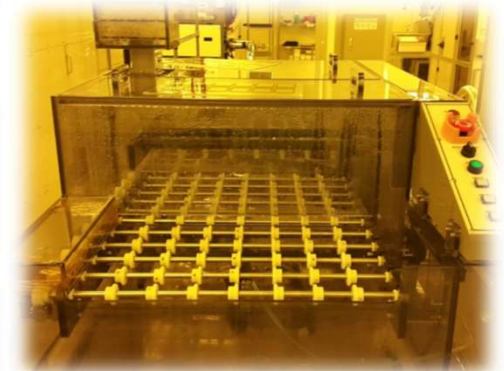
Company :	INTREE Co., Ltd.
Field of Business :	Photomask for metal mesh film, OLED TEST CELL
Number of employees :	26 people not include CEO
Capital :	400 million KRW
Place of Business :	Head office : 24-6, Chanumul-ro, Gwacheon-si, Gyeonggi-do, Republic of Korea Factory : Room 801~803, 681, Baekbeom-ro, Seo-gu, Incheon, Republic of Korea



Infra-structure

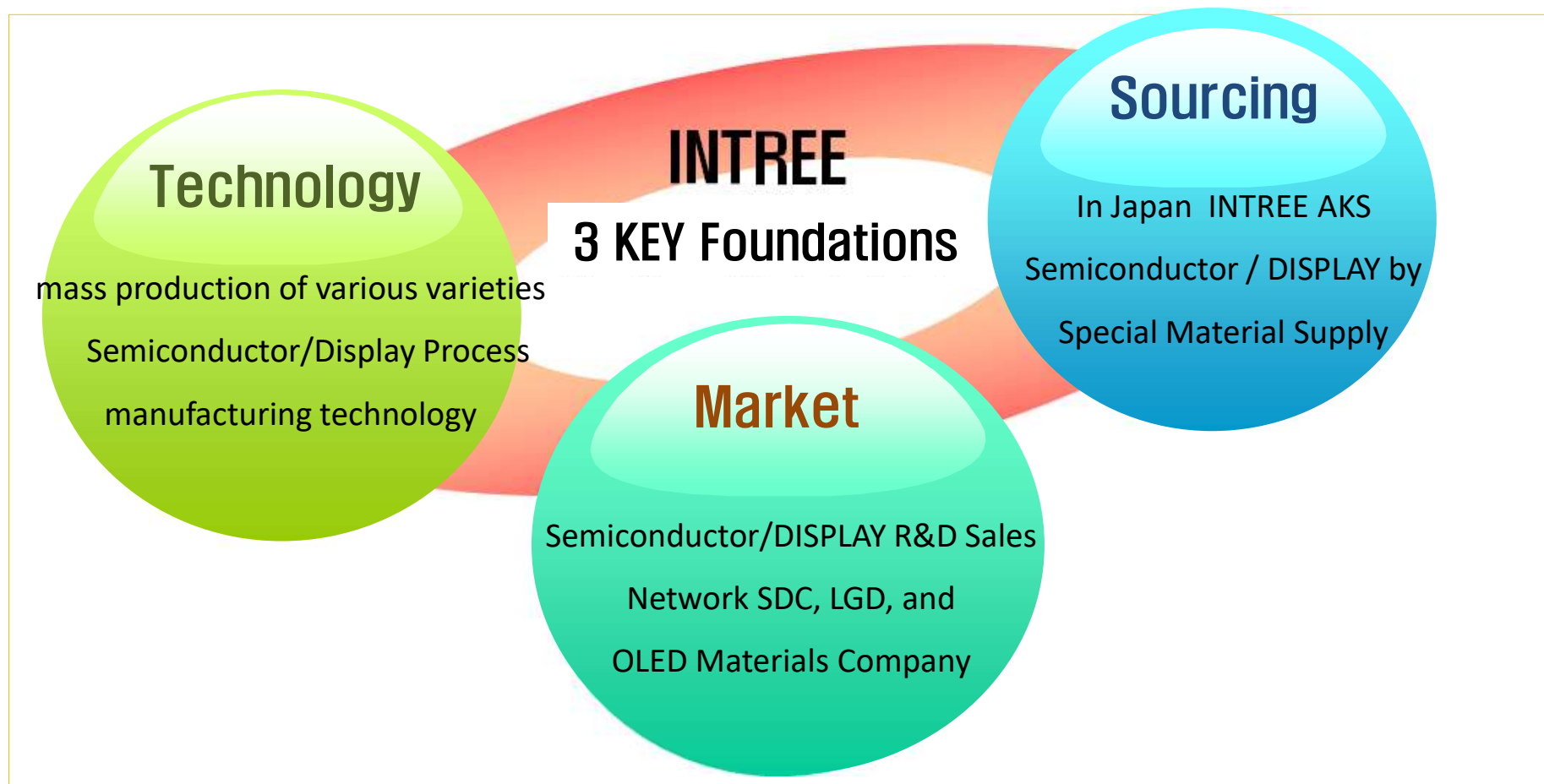
2G Patterning infra

- 1) Utility : DI / CDA / N2 / O2 / Ar
- 2) Multi target sputter (ITO, Ag, SiO2, Cu, Ti, Al, Mo, Cr)
- 3) Mask aligner (370*470)
- 4) Spin coater (370*470)
- 5) UV/O3 Cleaner
- 6) Atmosphere pressure plasma Cleaner
- 7) DFR Laminator
- 8) Hot plate Convection Oven
- 9) Convection oven & Hot plate
- 10) Wet bench
- 11) Ultra sonic cleaner
- 12) Wet Cleaner QDR
- 13) Glass Scribe
- 14) Spin dryer
- 15) Stereoscope
- 16) Reflectometer
- 17) 4 Point-probe
- 18) Alpha step
- 19) AFM
- 20) Spectrophotometer
- 21) SEM
- 22) Colorimeter





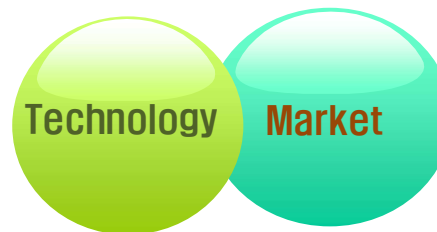
Vision



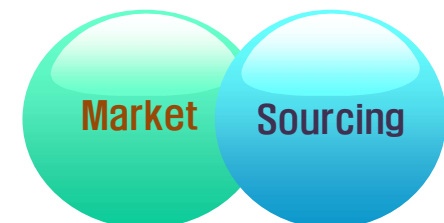
OLED Substrate Business New Business



R&D Service Foundry Business



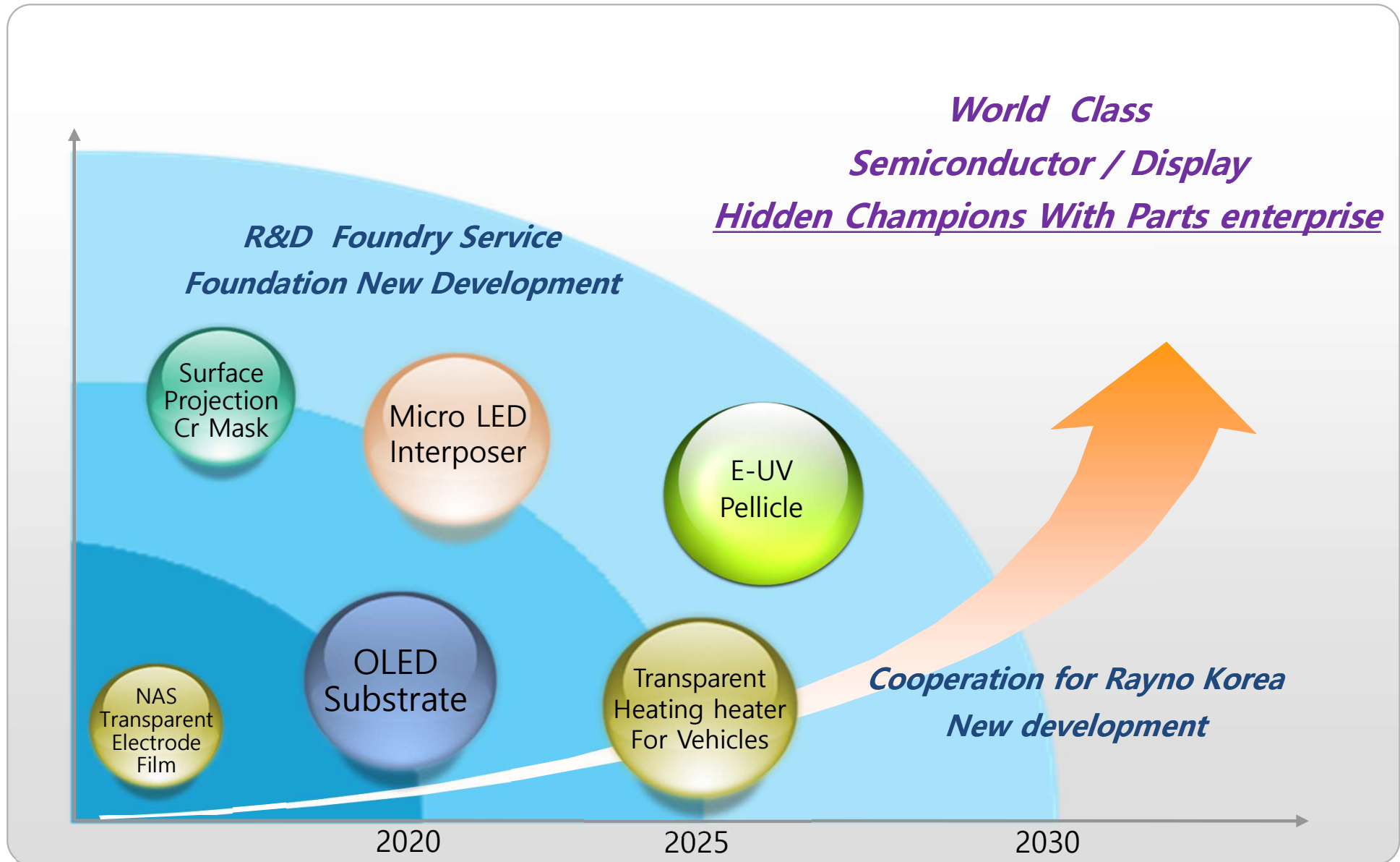
Special Material Distribution Business





Vision

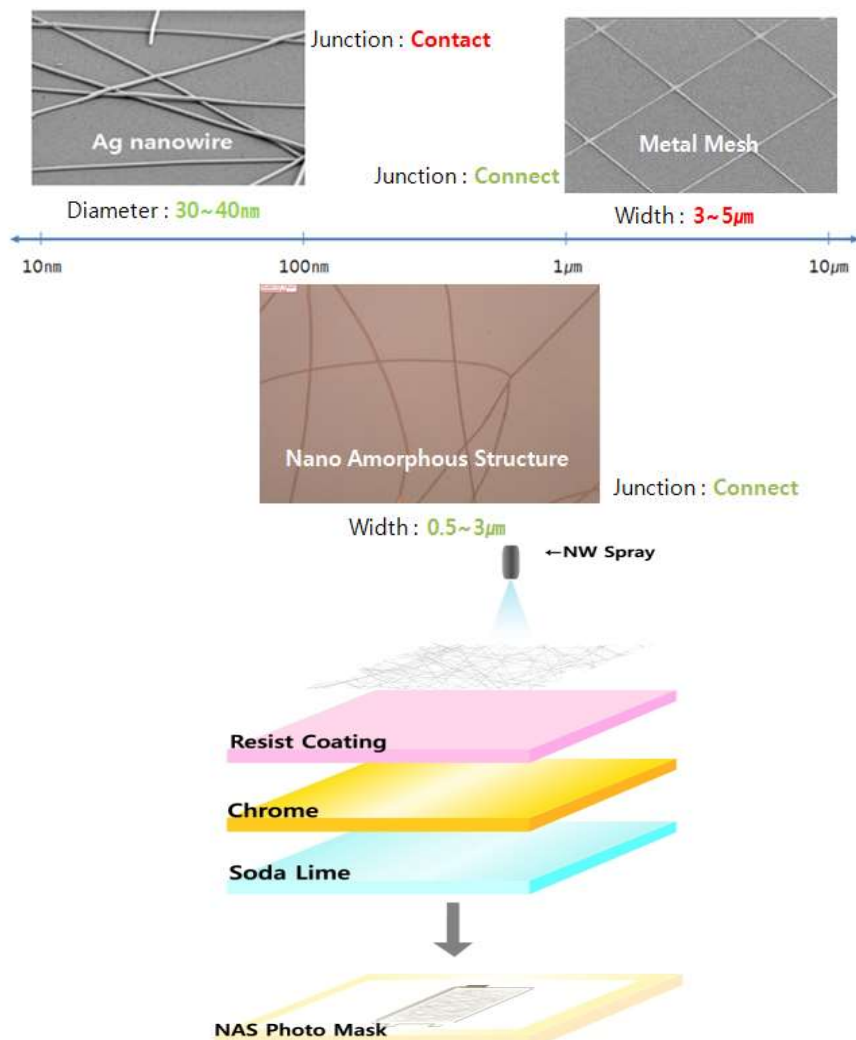
- Establishment of semiconductor/display process technology infrastructure for R&D organizations and customer service units, and securing product technology
- Establishment of a high-mix, large-scale production system for metal deposition pattern parts and materials.





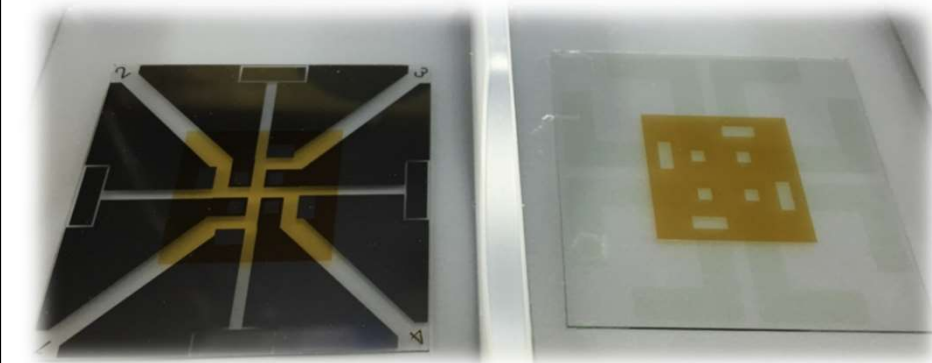
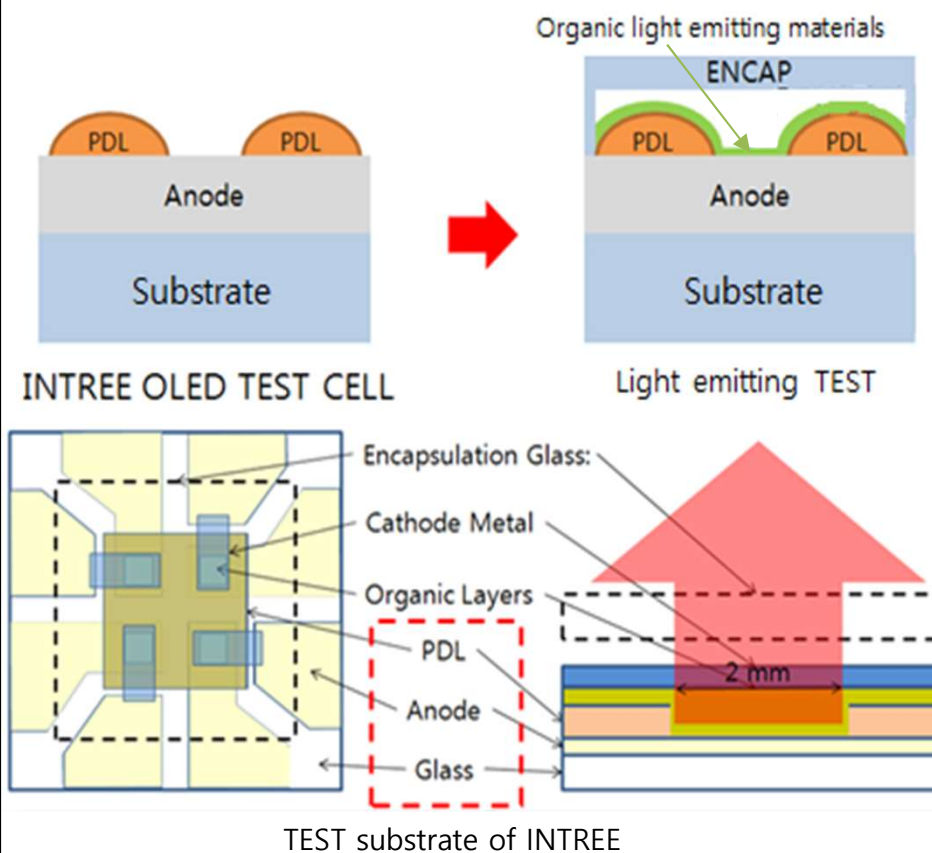
Product

NAS Transparent Electrode Film



A transparent electrode film made by a metal mesh film manufacturing Method by reflecting the amorphous ultra-fine network structure of Nanofiber patterns on a photomask.

OLED TEG CELL





OLED TEST Overview

In order to evaluate the performance of OLED light emitting materials, light emitting materials are deposited on the test cell to confirm their evaluation items.



○ Evaluation category

1) I-V-L Characteristics

J-V: Current Density(mA/cm^2) vs Voltage(volt)

L-V: Luminescence(cd/m^2) vs Voltage(volt)

L-J: Luminescence(cd/m^2) vs Current Density(mA/cm^2)

2) EL Spectrum : L-I: Luminous Intensity($\text{W}/\text{sr}\cdot\text{m}^2$) vs Wavelength(nm)

3) Color Coordinate : CIE1931(x,y), CIE1976(u' , v')

4) Emission Efficiency : Power efficiency: lm/W , Luminous efficiency: cd/A , Quantum efficiency: %

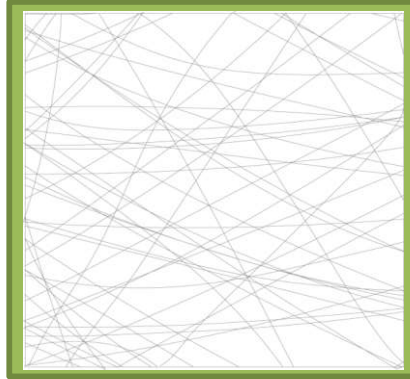
5) Reliability : T_{12} , T_{24} , T_{48} , T_{72} , $T_{50\%}$



○ INTREE Pattern Type

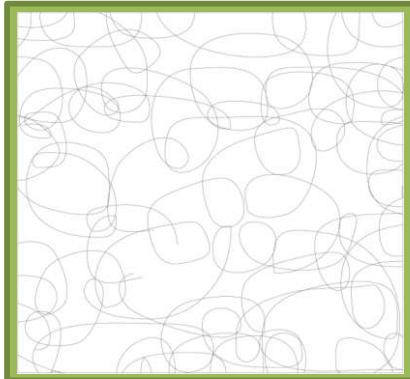
① Amorphous Straight line

Feature	Amorphous Straight Line
Line width	0.5~3 μ m
Density	1~15%
Merit	Moire improve
type	Positive, Negative



② Amorphous Spiral

Feature	Amorphous spiral Line
Line width	0.5~3 μ m
Density	1~15%
Merit	Starburst improve
type	Negative



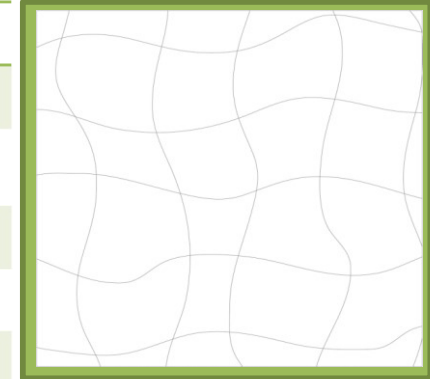
③ Amorphous Curve

Feature	Amorphous Curve Line
Line width	0.5~3 μ m
Density	7~15%
Merit	Starburst improve
type	Positive, Negative



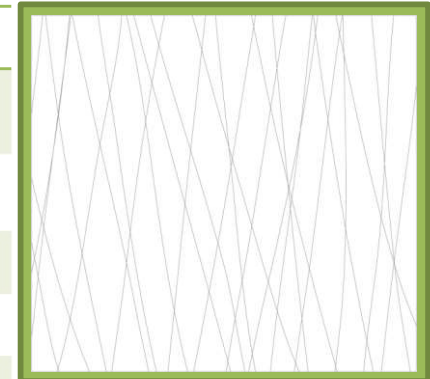
④ Amorphous Grid

Feature	Grid Curve Line
Line width	0.5~3 μ m
Density	1~5%
Merit	Transmittance
type	Positive, Negative



⑤ Anisotropic Straight Line

Feature	Anisotropy Straight Line (AR \approx 10)
Line width	0.5~3 μ m
Density	3~10%
Merit	Mobile
type	Positive, Negative



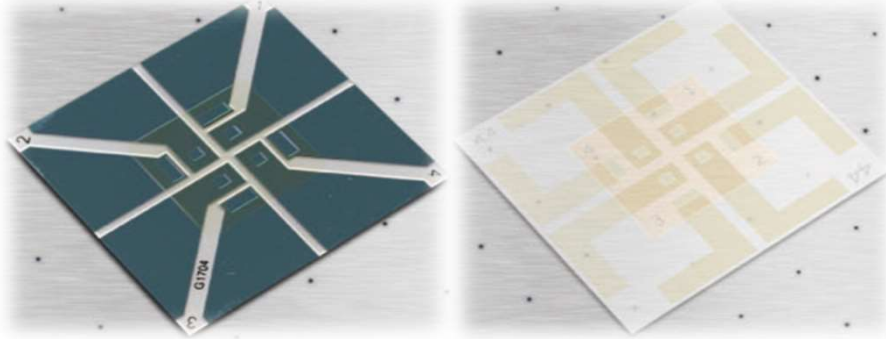
※ Corresponding range of INTREE SPL

- Present possible PM substrate size : 125X125 ~ 175X175 mm (200X200 ~ 400X400 mm can be possible after August, 2015)
- Possible pattern : ① ② ③
- ④ ⑤ Pattern : Under development



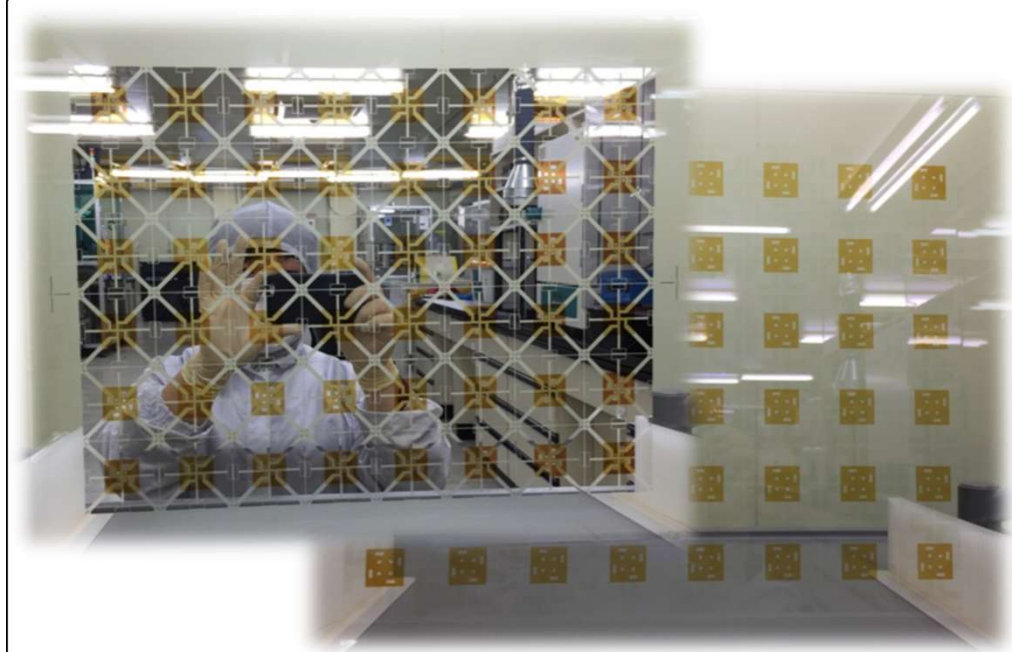
Product

Manufacturing Process



- 1) Structure : Glass+Anode (ITO or IAI) Pattern + PDL Pattern
- 2) Manufacturing Process
 - ① Electrode Deposition : ITO or IAI Sputtering
 - ② Electrode Pattern : Substrate Cleaning → PR Coating → Exposure → Development → Etching → Drying
 - ③ PDL Pattern : PR Coating → Exposure → Development → Curing
 - ④ After Process : Scribing → Braking → Ultrasonic Cleaning → Inspection/Packing

Manufacturing Competitiveness



- 1) Secure competitiveness in producing small quantities of multiple varieties through the **2nd-generation substrate** manual Photo equipment infra
- 2) Using a PDL material from T Company (Japan) and a substrate from G company (Japan), **Provides the same or equivalent materials as OLED panels.**

○ Evaluation Items

I-V-L Characteristics, EL Spectrum
Color Coordinate , Emission Efficiency
Reliability





Product (ITO / IAI Glass)

- ITO GLASS



ITEM	Standard Specifications
Glass Type	Non-Alkali Glass / Sodaime Glass
Glass Thickness	0.5T / 0.7T
ITO Thickness	500Å / 800Å / 1000Å / 1100Å / 1200Å / 1300Å / 1500Å
Resistance	10~30Ω/sq.
Remark	The specification board is in stock and can be responded to according to requests from customers

- IAI GLASS



ITEM	Standard Specifications
Glass Type	Non-Alkali Glass
Glass Thickness	0.7T
ITO Thickness	ITO 10nm/Ag alloy 100~200nm/ITO 5~50nm
Resistance	0.3~0.5Ω/sq.
Remark	The specification board is in stock and can be responded to according to requests from customers

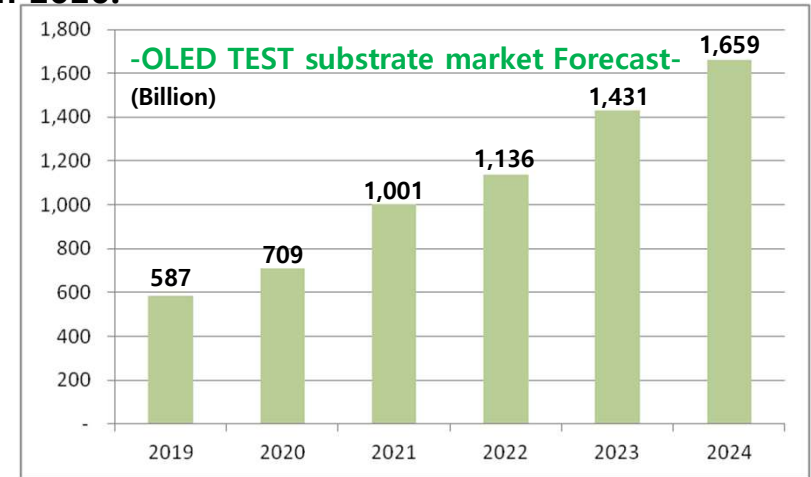
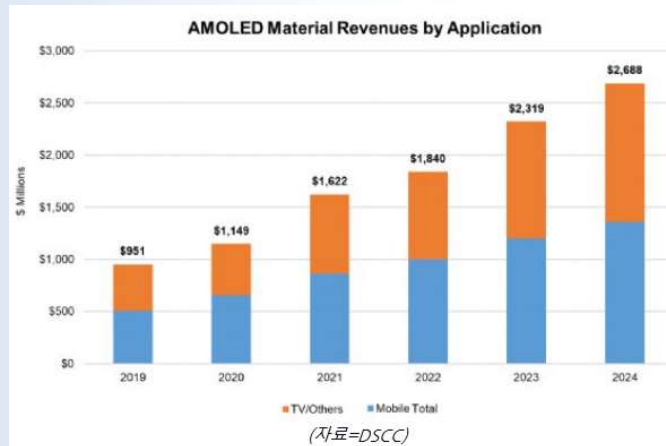
- Other than, GLASS (Mo, Al, Cr, Cu) deposition Glass



Sales and Market Status

OLED Substrate Market

- OLED substrate are dependent on the growth of the OLED material market, and the market size is calculated by substituting the annual substrate purchase cost compared to the annual sales of our customer company D in 2020.



Estimate Sales for 2024

- OLED TEG : Expected to generate about 70 Billion KRW
- R&D Service : SDC, LGD etc. Expected to incur about 25Billion KRW due to increased sales of Foundry Service
- Trade related sales such as Getter sheet and Encap Glass are expected to increase By 1Billion KRW.
- Expected to reach about 100Billion KRW in 2024

Revenue status by year of INTREE and estimated sales in 2024

