

2024 OLED Emitting Material report

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2. Analysis of OLED industry issues

2.1 8.6G IT line investment trend

- OLED displays for tablet PCs are being produced on the ***** line using ***** and Tandem ***** structures.
- Samsung Display decided to invest in *****K 8.6G line per month to produce ***** and Tandem ***** structured panels in April 2023, and mass production expected after Q2 2026.
- BOE has started investing in a monthly *****K 8.6G line for mass production of panels with ***** and Tandem ***** structure.

OLED application technology for tablet PC by panel company

	Samsung Display	LG Display	BOE
6G			
Type	AMOLED	AMOLED	AMOLED
TFT	None	None	None
OLED	1-track W/OB	1-track W/OB	1-track W/OB
Encapsulation	ITO	ITO	ITO
Mask	P1000	P1000	P1000
Glass	AGC	AGC	AGC
8.6G			
Type	AMOLED	AMOLED	AMOLED
TFT	None	None	None
OLED	1-track W/OB (with 2-subpixels)	1-track W/OB (with 2-subpixels)	1-track W/OB
Encapsulation	ITO + P1000	ITO + P1000 (Pass mask)	ITO
Mask	P1000 (Open mask)	P1000 (Open mask)	P1000
Glass(Evaporation)	AGC (Full size)	AGC (Full size)	AGC

2. Analysis of OLED industry issues

2.2 Apple iPad OLED application

■ Apple

- Apple launches iPad Pro 11.1-inch and 12.9-inch models in 2024 with ***** structure, ***** OLEDs.
- The smaller sub-models of the iPad, ***** and ***** , may use single-structure, *****-driven ***** after *****.

■ Samsung Display

- Samsung Display produces panels for the ***** inch ***** in its *****.
- Samsung Display was finally ***** by ***** in ***** , and estimated OLED production for ***** this year is ***** units.

■ LG Display

- LG Display is producing panels for the 12.9-inch and 11.1-inch ***** on the *****.
- LG Display's expected production of OLED for ***** in 2024 is ***** units.

3. Trends in development of emitting materials

3.3 High-efficiency and long-life emitting materials

■ New blue light-emitting material : Samsung Electronics SAIT

- SAIT announced non-Boron -based MR-TADF (Multi-resonant thermally activated delay fluorescence) light-emitting material at IMID 2023.
- Boron -based MR-TADF material, which is currently mass-produced as a blue fluorescent material, is difficult to synthesize and has limitations in material development.
- Non-boron-based luminescent materials being developed by SAIT ***** by second order reverse intersystem crossing (RISC) by *****. A material with CIEy: ***** , FWHM: ***** , and EQE of *****% was announced, and the lifespan characteristics were not disclosed.

SAIT 's major announcements regarding non-Boron -based MR-TADF

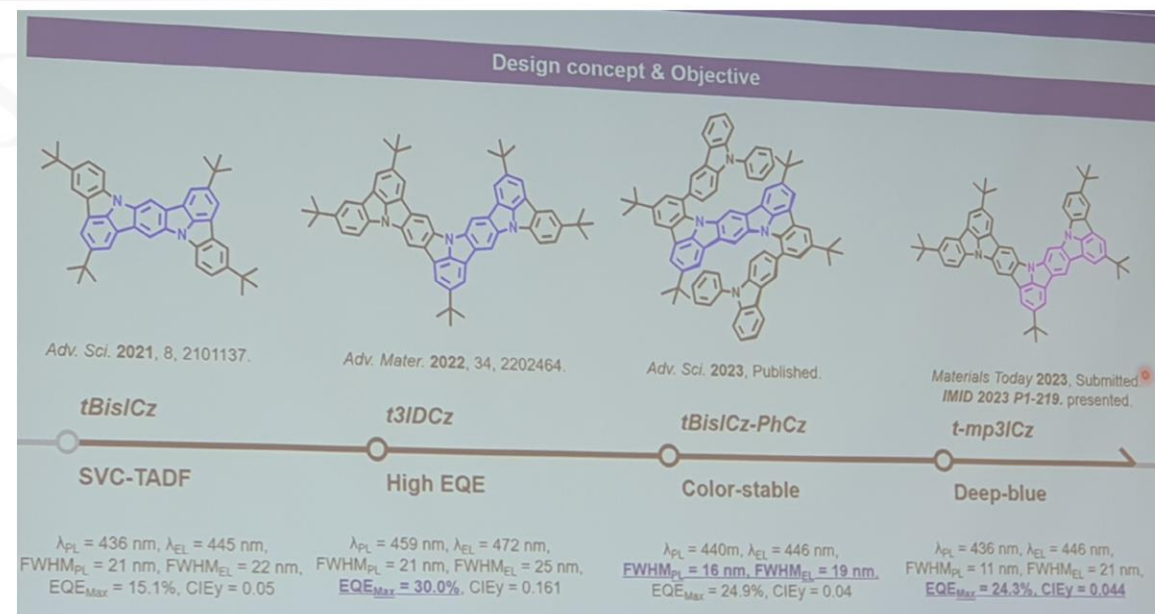
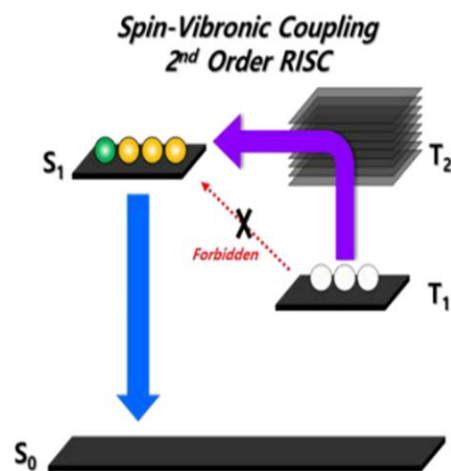
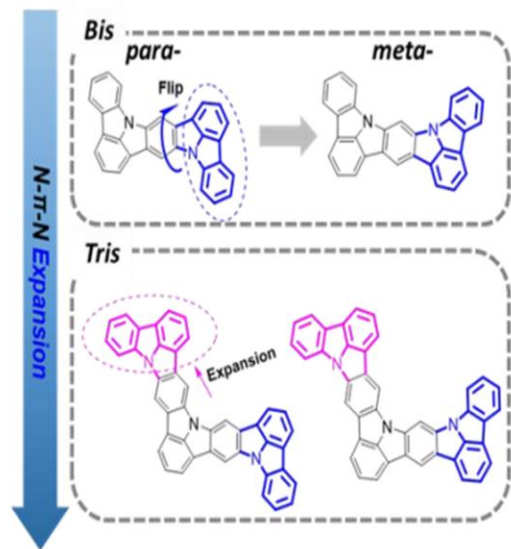


Fig. 1. The chemical structures of non-boron materials and SVC mechanism

4. Trends of emitting material companies

4.2 Current status of Chinese emitting material companies

■ LTOM (莱特特电)

- LTOM was established in Xian City in 2010 and is mainly developing emitters, intermediates for emitters, and intermediates for medical drugs.
- In addition to *****, the company mainly mass-produces ***** and supplies ***** to *****, *****, *****,
- Products under development include *****, *****, and *****. Honor's Magic6 smartphone, released in March 2024, features ***** from ***** and uses ***** product.
- When ***** was supplied to *****, ***** personnel directly built the line, internal management system, and development support, and BOE has a 5% stake in the company.
- It was listed on Guochangpan(科创板), China 's version of Nasdaq, on March 18, 2022, and in 2023, sales reached ***** yuan and net profit reached ***** yuan.

■ Summer Sprout(夏禾科技)

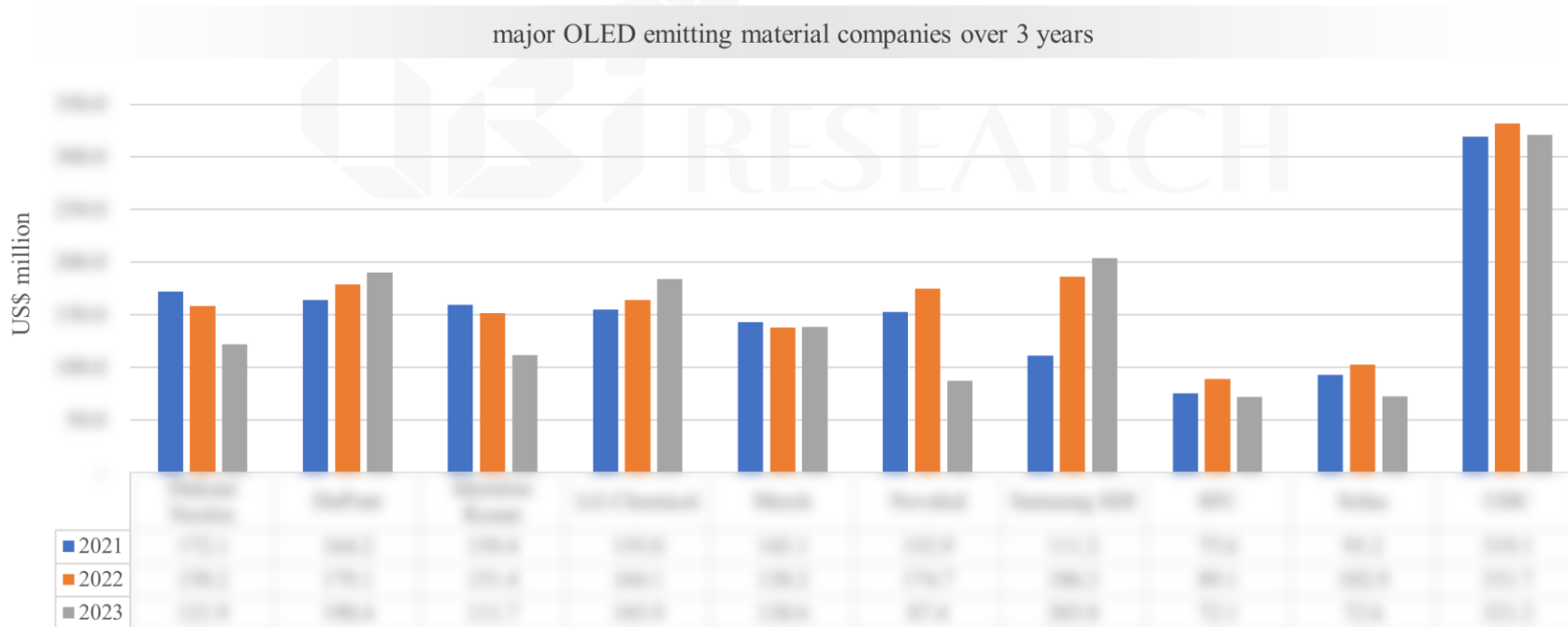
- Summer Sprout established a research center in Beijing in 2017, and opened a mass production plant in Taixing, Jiangsu Province in June 2023.
- The number of employees at the Beijing headquarters is estimated to be approximately 121 as of 2022, with a total of more than 80 people with doctoral degrees and master's degrees. Personnel who worked at ***** are leading product development, Personnel from Tsinghua University, Beijing University, Nanjing University, etc. are participating. As of 2022, 87 people are working in Jangsu Province.
- ***** is the main product in production, and the company is developing ***** and *****, *****, *****, etc. It supplies *****, *****, and ***** to *****, and is also supplying ***** to *****'s tandem *****.
- ***** introduced its own designed ***** and exhibited the product at *****.

8. OLED emitting material sales analysis

8.8 By material company

Annual sales analysis

- Over the past three years, the top three major light-emitting materials companies by overall sales were *****, *****, and *****, with sales of \$9.72bn, \$5.33bn, and \$5.01bn, respectively.
- In 2023, ***** will have the largest sales of \$3.21bn, followed by ***** with \$200.3bn and ***** with \$190 million.



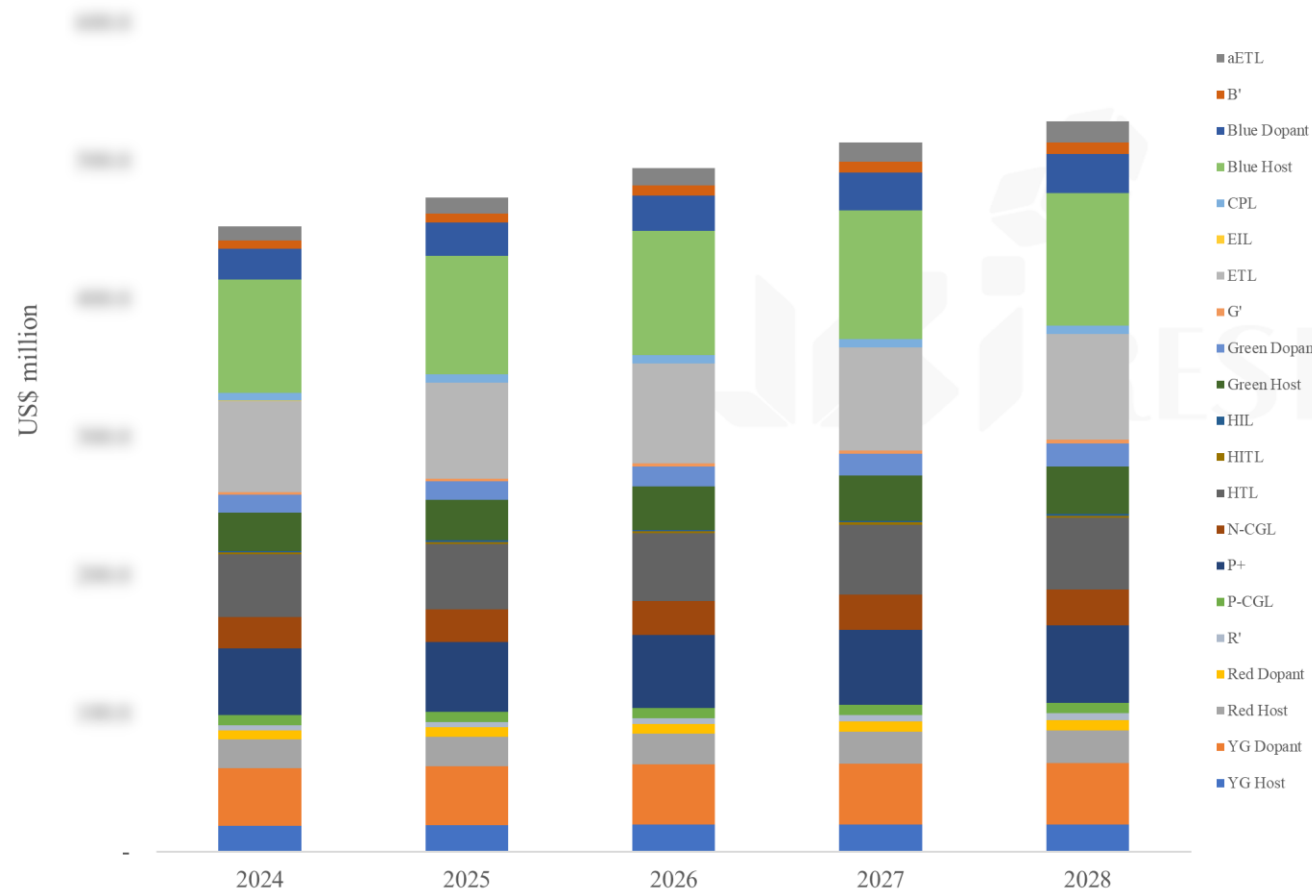
Source: UBI Research DB

11. OLED emitting material market outlook

11.6 By emitting material

Medium to Large

Sales forecast by material_large sized OLED



Source: UBI Research DB

(US\$ million)

Material	2023	2024	2025	2026	2027
YG host	100	100	100	100	100
YG dopant	100	100	100	100	100
Red host	100	100	100	100	100
red dopant	100	100	100	100	100
R'	100	100	100	100	100
P-CGL	100	100	100	100	100
P+	100	100	100	100	100
N-CGL	100	100	100	100	100
HTL	100	100	100	100	100
HITL	100	100	100	100	100
HIL	100	100	100	100	100
Green host	100	100	100	100	100
green dopant	100	100	100	100	100
G'	100	100	100	100	100
ETL	100	100	100	100	100
EIL	100	100	100	100	100
CPL	100	100	100	100	100
Blue host	100	100	100	100	100
Blue dopant	100	100	100	100	100
B'	100	100	100	100	100
aETL	100	100	100	100	100

Source: UBI Research DB



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