

Presentation for R&D of Performance Materials  
Q&A Session Summary

Date: Tuesday, June 21, 2022 : 2:00pm to 4:00pm

Presenter:

Ishikawa, Senior Managing Executive Officer, Head of Performance Materials Division

Nihira, Associate Executive Officer, Head of Materials Research Laboratories

Tsutsui, General Manager, Display Materials Research Department

Sakamoto, General Manager, Semiconductor Materials Research Department

Takakuma, General Manager, Inorganic Materials Research Department

Sugiura, General Manager, Advanced Materials Research Department

Q&A Respondents:

Miyazaki, Director

Daimon, Managing Executive Officer, CFO

\*The following members all belong to Performance Materials Division.

Nakada, General Manager, Display Materials Department

Wada, General Manager, Semiconductor Materials Department

Sugiyama, General Manager, Inorganic Materials Department

Otsuka, General Manager, Planning & Development Department

Presentation Materials:

[https://www.nissanchem.co.jp/eng/news\\_release/release/en2022\\_06\\_21.pdf](https://www.nissanchem.co.jp/eng/news_release/release/en2022_06_21.pdf)

**■ Questions about Performance Materials Overall**

Q1: Please share your thoughts on the profitability of Performance Materials in general. Semiconductor Materials' profitability has improved considerably over these years. Please tell us about the factors behind this. Also, Display Materials' profitability is maintained at a very high level. Please tell us about this sustainability.

A1: First, the improvement of Semiconductor Materials' profitability is mainly attributable to the larger net sales. Front line EUV contributes to sales, but the current main key drivers are ArF related anti-reflective coating and multi-layer process materials, which are growing greatly.

Second, we are concerned about price competition which will affect the profitability of Display Materials. Currently, we are pursuing a strategy of keeping prices at the average against the backdrop of a large share of photo-alignment IPS. Securing this income while thoroughly implementing cost reductions is our current situation. We plan to follow this policy in the future. However, since we assume that competition will become more severe, we have

incorporated price declines into our plan at a certain rate.

Q2: Please tell us about the future earnings growth of each sub-segment, including the outlook of fixed costs.

A2: For Semiconductor Materials, the depreciation of capex is reflected in operating income. We see Semiconductor Materials as an area continuing to grow, and we plan to continue to invest aggressively after FY2027 as well to grow our businesses. The reason for the decline in operating income in FY2024 is an increase in depreciation costs for the new NCK plant. We plan to increase operating income by reducing the fixed cost from FY2024 to FY2027.

Although we do not expect any major changes in the income structure for Display Materials, it is true that there will be some factors that will become more severe in the future amid falling prices amid rising volumes. We plan to secure operating income through FY2027 by thoroughly implementing cost reductions and broadly reviewing fixed costs. Within the mid-term plan, fixed costs at Display Materials are expected to increase from FY2021 to FY2024 and decrease from FY2024 to FY2027. Nevertheless, we expect Display Materials' income to decline in FY2027 compared to FY2024 because we see very large declines in photo-alignment IPS prices.

Recognizing that profitability needs to be improved, we are currently implementing measures in Inorganic Materials. We have not yet seen profitability improvement in the plan for FY2027, but Inorganic Materials' Businesses are moving forward with the recognition that this mid-term plan period is for preparing to take steps to significantly improve OP margin from FY2027 onwards.

### ■ Questions about Display Materials

Q3: Are OLED materials developed only for printing-type?

A3: Of the materials on page 50, Hole Injection Layer and Bank material are limited to printing-type, while De-Bonding Layer and Light Extraction Enhancement Materials are developed for both printing and vapor deposition types.

### ■ Questions about Semiconductor Materials

Q4: Some semiconductor materials manufacturers are integrated manufacturers of photoresists and ARC and multi layer process materials. Nissan Chemical does not have any photoresists in Semiconductor Materials' product lineup. Please share your strengths or weaknesses due to this.

A4: We believe that our ability as a specialized manufacturer of BARC to collaborate with domestic photoresist manufacturers that do not have BARC is an advantage.

Q5: Please tell us if anything other than Temporary Bonding Materials is promising about semiconductor packaging materials..

A5: As shown on page 32, we are also considering various systems for Temporary Bonding Materials. We are primarily focusing on and developing mechanical de-bonding and laser de-bonding, and the next-generation technologies for mechanical de-bonding include TCB\*<sup>1</sup> and hybrid bonding. We are also developing materials for RDL to adopt in the next generation.

\*1: Abbreviation of Thermal Compression Bonding.

Q6: As shown on page 6, the items to be manufactured at the plant in South Korea (NCK) are materials for semiconductors. What are the items to be supplied? Can you also expand into regions other than South Korea?

A6: Regarding items, we plan to create a plant that can be manufactured evenly across the board at Semiconductor Materials. We are also designing the system so that it can be deployed in regions other than South Korea as necessary.

Q7: Regarding the lineup of temporary bonding materials on page 32, what part Nissan Chemical is doing, and which are expected in the next generation?

A7: What is moving on a mass production base is mechanical de-bond. In order to reduce the warpage of laminated substrates and damage caused by further thinning progress, we are studying both for laser de-bonding and for TCB, which is a type of mechanical de-bond. Although both are expected materials, laser de-bonding is not yet in the mass production stage.

Q8: As for the order in which temporary bonding materials start on page 32, the TCB, which is the next generation of mechanical de-bonding, and the hybrid-bonding, start first, and then the next generation of laser de-bonding?

A8: That's right. As for TCB, I think it is not so far away.

Q9: On page 6, it shows SP-7 (advanced defect detection equipment) was installed. Is this different from mid-term plan evaluation equipment (semiconductor evaluation equipment 1.2 billion yen) shown on page 12? I assume the depreciation method of semiconductor-related is 4-year declining balance method. Is this also depreciated with the same method?

A9: SP-7 is separate from the device planned for the mid-term plan and has already been installed. Depreciation will be performed at 4-year declining balance method.

Q10: Are the functions of EUV under layer and EUV silicon hard mask identical?

A10: Basic performance for lithography such as resist profile control and pattern collapse prevention is the same. On the other hand, EUV under layer specializes in lithography performance, and for EUV silicon hard mask it is also used as a mask for etching the substrate, so etching properties are also important.

Q11: Regarding Semiconductor Materials, there has been an explanation that in addition to ArF, EUV will also come in. Please tell us how sales per unit area of wafers will change.

A11: With the EUV and other advanced processes, the unit price of materials will also increase. In addition, as the number of layers increases along with the advancement of the technology, we believe that from the perspective of increasing the overall volume of materials used, the size of sales per unit area of wafers will also grow.

End of Q&A Session