蔚華科技
SPIROX

Spirox Group

Professional Semiconductor Equipment Provider

Delivering Smarter Solutions

Safe Harbor Notice

- This presentation contains "forward-looking statements" and based on our own information and information from other sources we believe to be reliable. Our actual results of operations, financial condition or business prospects may differ materially from those expressed or implied in these forward-looking statements for a variety of risk factors which are beyond our control.
- The forward-looking statements in this presentation reflect our current expectations. About these forward-looking statements, we undertake no obligation to update any forward-looking statement, whether as a result of new information, future events, or otherwise.
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Agenda

- Company Profile & Product Portfolio
- Financial Review
- Q&A

Overview

Hsinchu, Taiwan | HQ

蔚華科技 SPIROX

- Own Products
- Semiconductor Equipment Distribution
- Board Repair Service

Subsidiary

Jetek Technology Corp.
- System Integration Services
- Customized Test Solutions

Southport Corporation
- Advanced Optics Technologies

Spirox Technology Shanghai
- Semiconductor Equipment Distribution
- Board Repair Service

Spirox Group

- Established in 1987
- TWSE: 3055, Listed in 2002
- Capital: 38.3M USD
- Market Cap: 264M USD (as of 2024/8/19)
- Employees: 180 (as of 2024/08)
- Business Coverage: Semiconductor Test/Package/Inspection Equipment

Spirox Products

- SP2500 SoC Test System
- MA6503D Micro Inspection System
- SP3055A Non-destructive Inspection System
- SP3055S Non-contact Whole Wafer / MicroArea 3D Stress Inspection and Analysis System for WBG Materials

Distribution Products

AEM Wafer Test Solutions · HAMAMATSU PHOTON IS OUR BUSINESS · TESCAN · semics · TORAY Toray Engineering Co.,Ltd. · Osai automation systems

Core Competencies

Business Philosophy

Build a customer-oriented culture and set win-win goals with customers and partners.

Industry Experience

With over 30 years of experience in semiconductor industry, Spirox has a strong and stable customer base.

Professional Team

- **Years of service:**
  - 140 employees with 5Y+
  - 103 employees with 10Y+
  - 82 employees with 15Y+
  - 55 employees with 20Y+
- **Education:**
  - 138 employees have a college degree or higher (77%)
  - 40 employees have a master's degree (22%)
  - 2 employees have a PhD (1%)

R&D Capability

Test solution development and Investment on own-product

Strong FIN

Strong & health finance status

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Delivering Smarter Solutions™

Assembly and Test + Quality Assurance Solutions

Chip Probing → IC Package → IC Final Testing

IC Process & Quality Assurance




ATE

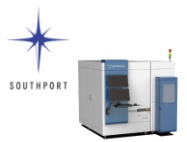


Handler


Prober


Chuck


Test Interface


MicroLED Inspection


TCB Bonder


Blade Dicing Saw


Vacuum Reflow


Reflow system


Plasma

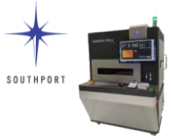

Heat Sink Laminator


Measurement


Automatic Debond Warpage Adjustment


EFA


PFA


MA


ESD


Nanoprobes

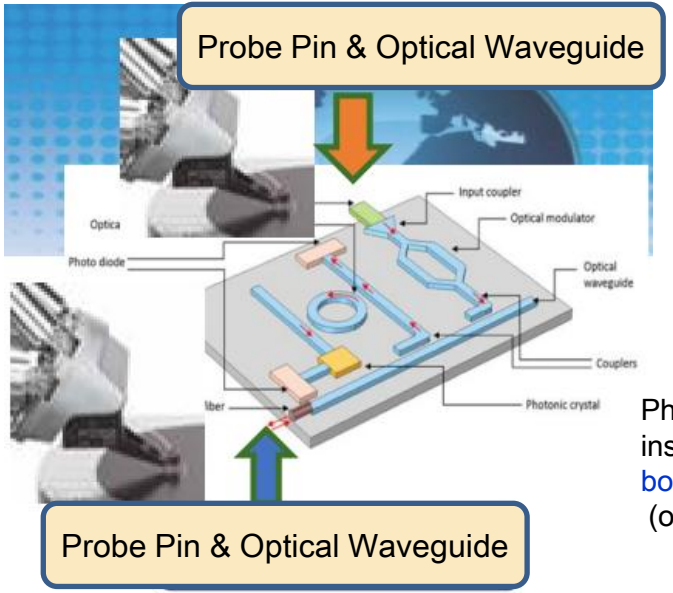


AOI(PKG)



AOI(Wafer)

Silicon Photonics On-Wafer Measurement

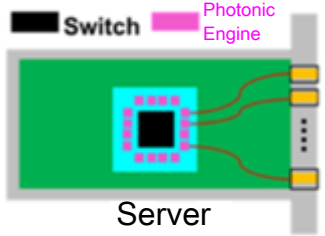


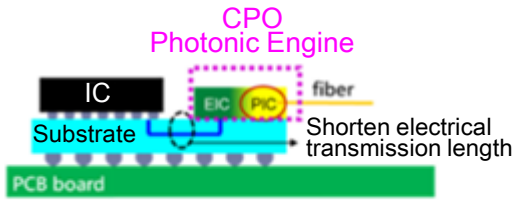
TSMC President C.C. Wei mentioned the development progress of silicon photonics technology at the North America Technology Symposium. He stated that by 2025, TSMC will complete COUPE validation to support small form-factor pluggable connectors. In 2026, TSMC plans to integrate CoWoS packaging to create co-packaged optics (CPO), directly incorporating optical connectivity into the packaging.

Source: Economic Daily News, 2024/4/26

➢ CPO Module Architecture

Photonic engine installed on the server board (on the CPO module)





	EIC (Electronic IC)	PIC (Photonic IC)
Semiconductor Device	Transistor (Electronic Signal)	Optical Waveguide (Optical Signal)
On-Wafer Measurement	Probe Card + Microscopy Positioning	Optical-coupled Alignment Equipment

Transforming Spirox

- Expand the development of Spirox own products to enter markets beyond the Greater China
- Start with automotive compound semiconductor

- SP3055A Non-destructive Inspection System (JadeSiC-NK)
- SP3055S Non-contact Whole Wafer / MicroArea 3D Stress Inspection and Analysis (JadeSA-WBG)

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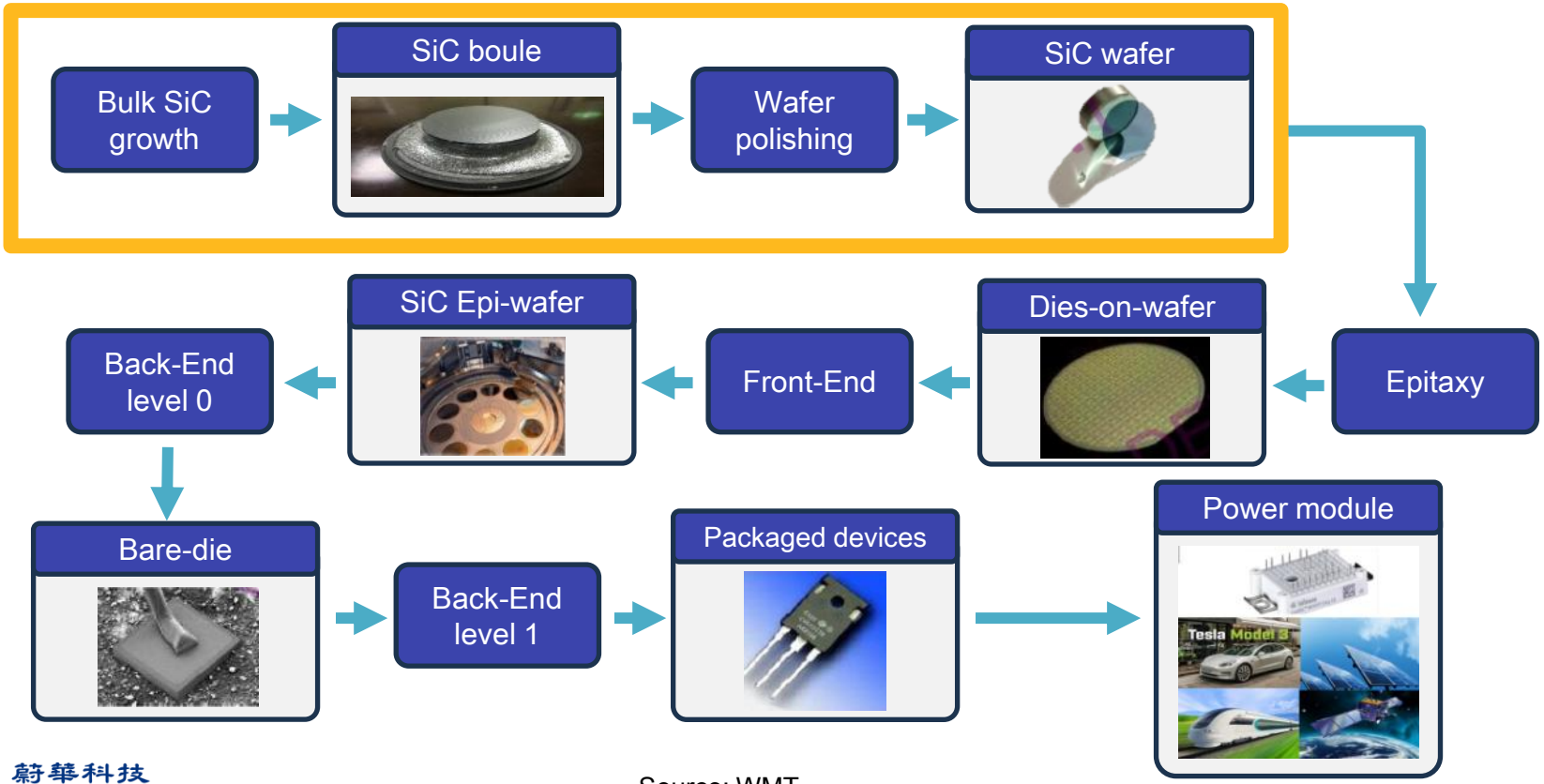
AEM Wafer Test Solutions · HAMAMATSU PHOTON IS OUR BUSINESS · TESCAN · semics · TORAY Toray Engineering Co.,Ltd. · Osai automation systems

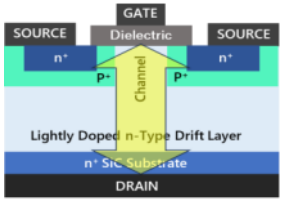
SiC Substrate: Crystal Growth, Cutting, Grinding and Polishing

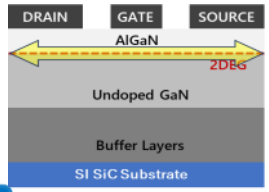


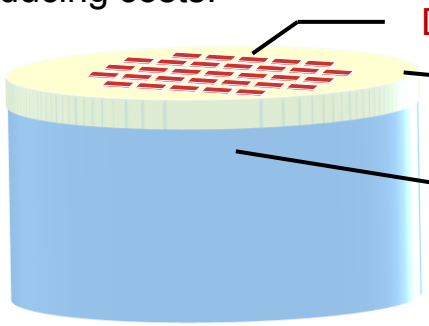
Source: WMT

Current SiC Substrate Challenges

- The overall effective output of the industry is insufficient and imbalanced.
- Lack of control over the quality and defects of ingots and substrates (especially killing defects).
- No effective non-destructive inspection technology for killing defects in the substrate manufacturing process.
- Difficulties in consistently improving effective output and reducing costs.







Basal Planar Dislocation, MicroPipes, Threading Screw Dislocations, Stacking Fault

SiC Substrate quality

Withstand voltage

Epilayer support

Non-Crystal defect

Other Tools

Crystal Killer defect

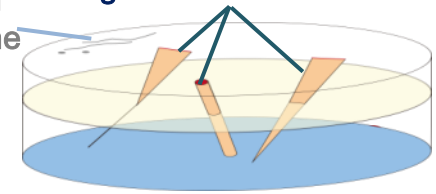
JadeSiC-NK

Stress

JadeSA-WBG

Non-crystal defects on the surface

Killing defects under the surface



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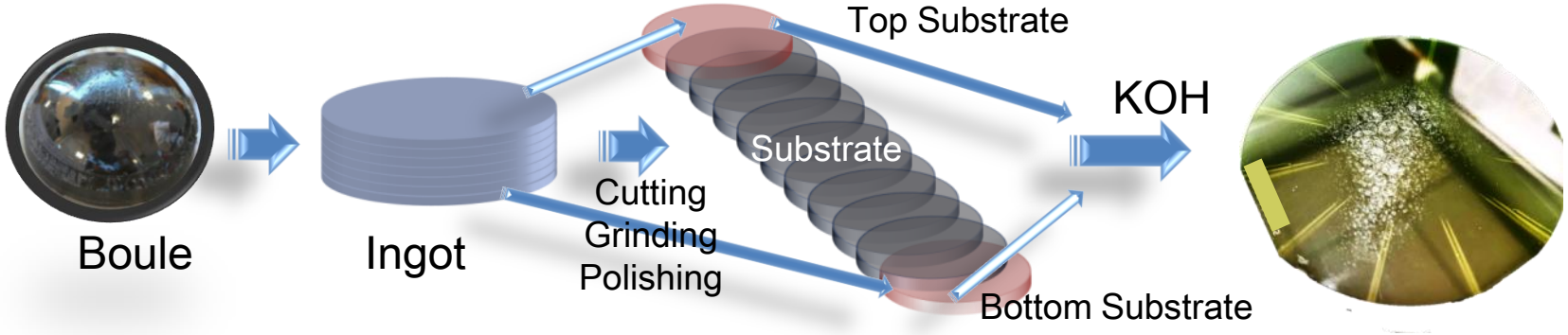
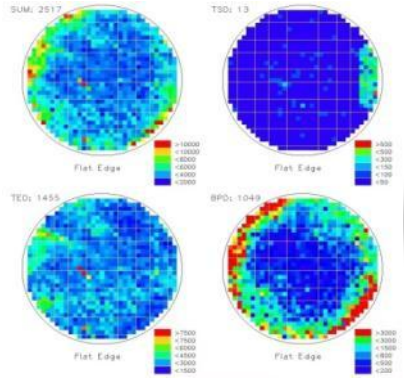
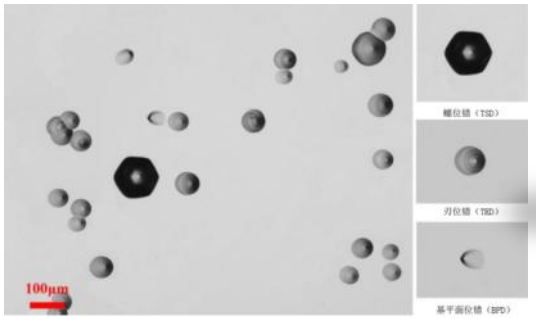
Destructive KOH Etching for SiC Substrate Inspection





Sampling of Substrate's surface after KOH etching.



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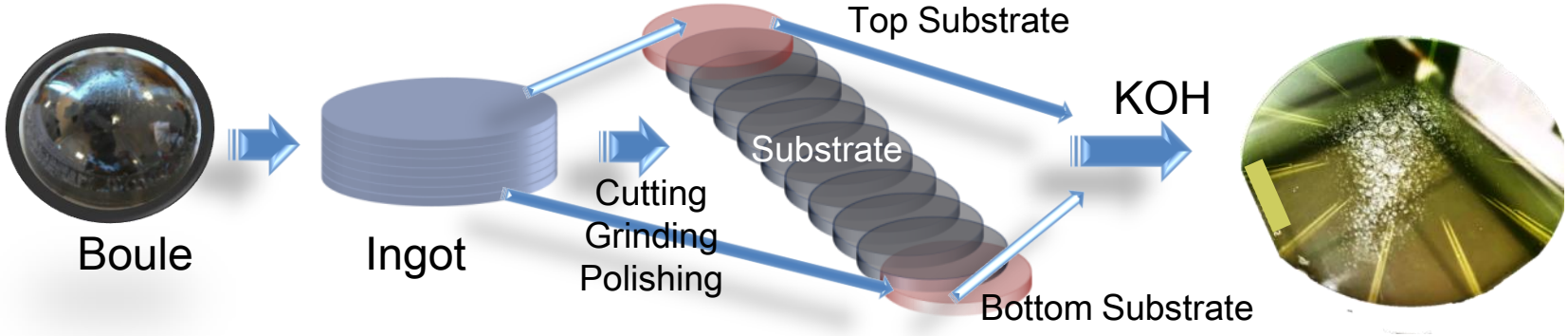
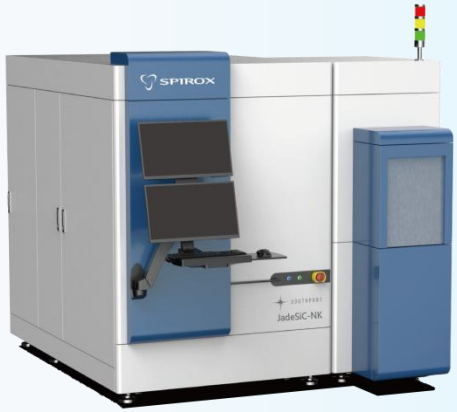
Destructive KOH Etching for SiC Substrate Inspection



Issues with current KOH method:

1. Destructive inspection leads to waste of production capacity and costs. Consistency in chemical etching accuracy is difficult to achieve, and there are environmental concerns.
2. Only two substrates are inspected from each ingot, which cannot fully represent the quality of other substrates from the same ingot. The BPD defect density between the top and bottom substrates often varies significantly, and the defect density of other substrates is by estimation, making it difficult to accurately control the yield of future devices (Killing defects: BPD, TSD, TED).
3. Currently, ingot manufacturers generally do not provide crystal defect distribution maps, making it challenging for device manufacturers to adjust process parameters and identify methods to improve yield.

Compound Semiconductor Solutions



JadeSiC-NK

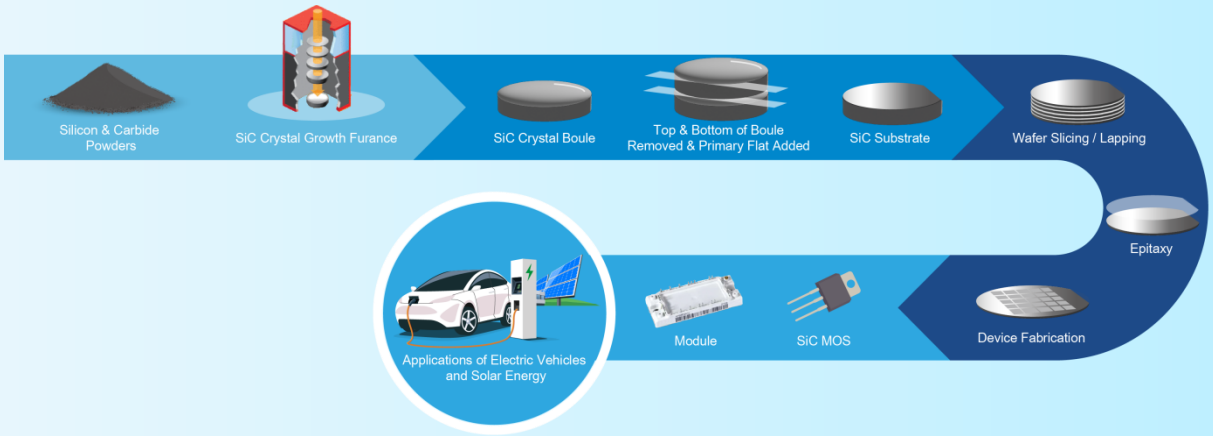
Non-Destructive Inspection System

- Advanced **NLO (non-linear optics)** technology
- **Non-destructive** inspection technology
- **Killer defects** (BPD, TSD, MicroPipe, SF) inspection **on the surface** and **in the substrate**
- **MicroArea 3D scan** function available

JadeSA-WBG

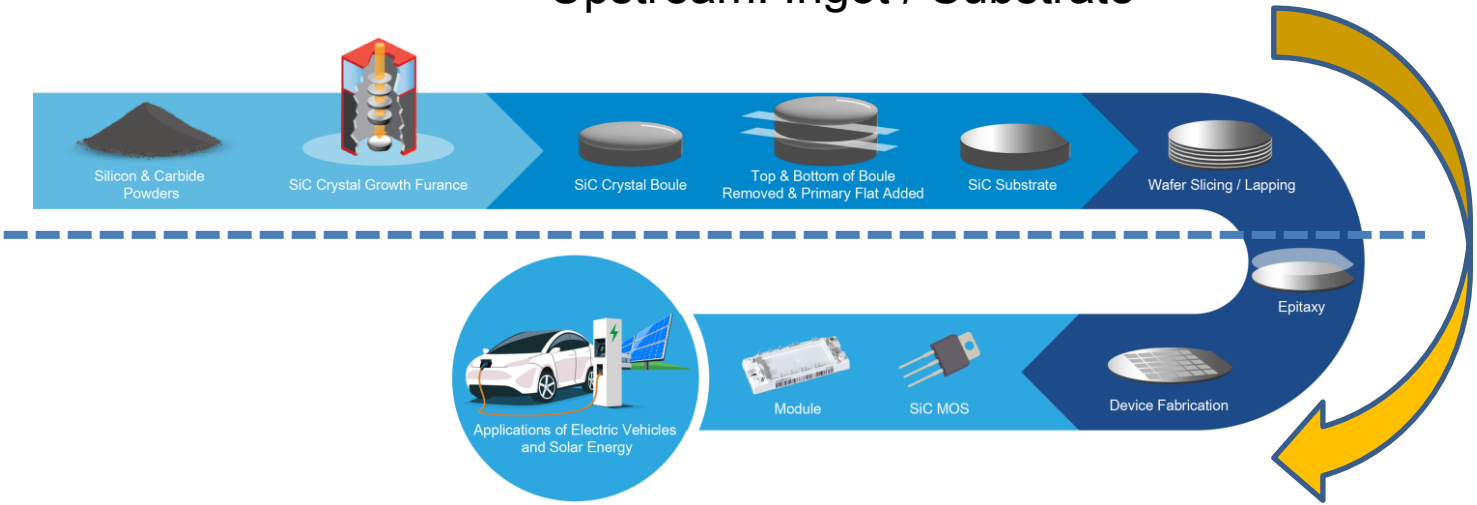
3D Stress Inspection & Analysis System

- Wafer scan **on surface** and **in depth** for stress distribution
- Whole wafer scan at **specific depth** with stress mapping
- Whole wafer **3D polytype** analysis
- **MicroArea 3D stress mapping / polytype** analysis



Current Business Model

Upstream: Ingot / Substrate

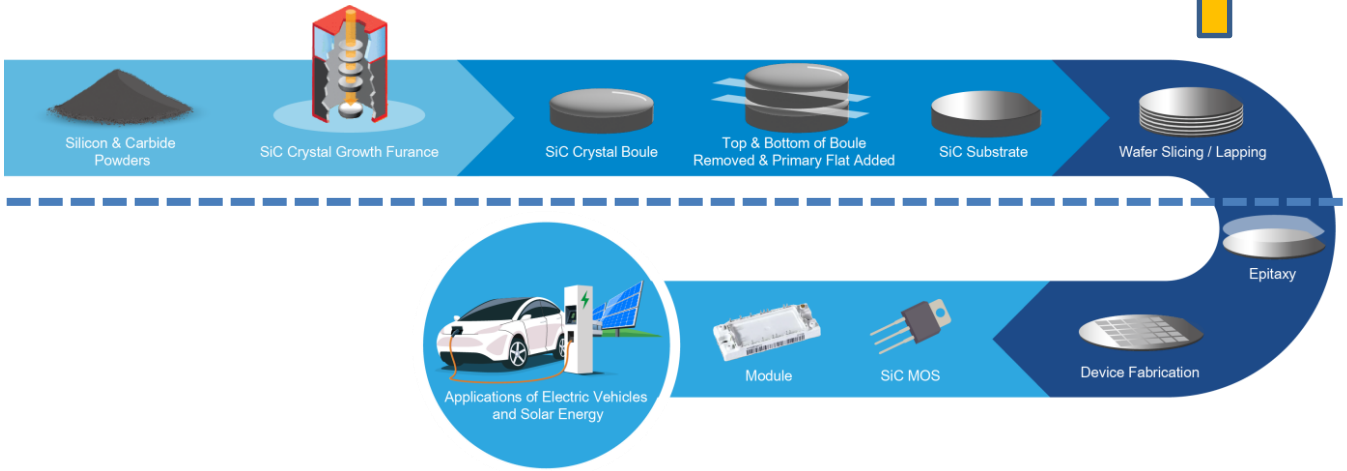


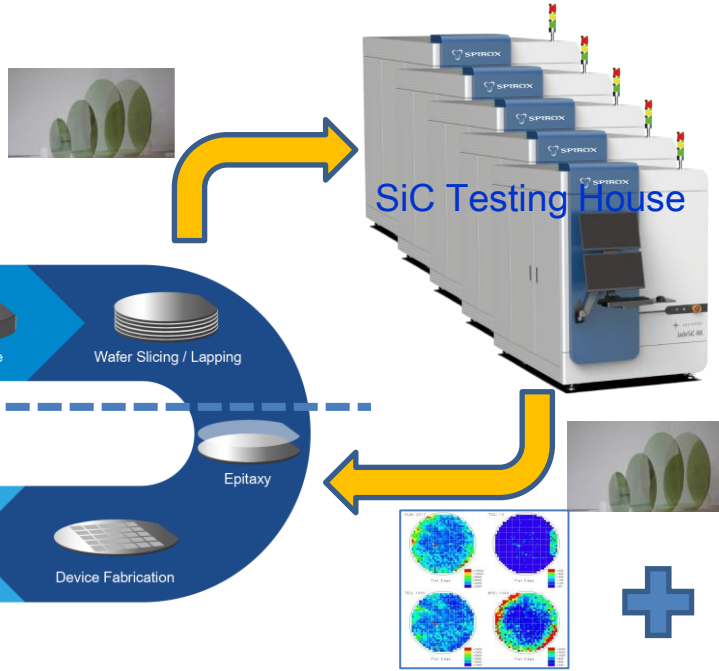
The upstream suppliers provide SiC substrates with defect density grades determined by highly inaccurate KOH etching directly according to the downstream manufacturers' requirements.

Downstream: Epitaxy / Device / Module

Future Business Model

Upstream: Ingot / Substrate





Downstream: Epitaxy / Device / Module

Provide complete defect (BPD/TSD/TED) report for every SiC substrate from the testing house or test production lines to optimize the process and improve yield.

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Financial Review

Summary of Consolidated Cash Flow Highlights & Financial Ratio

Consolidated Statements of Cash Floows Summary (In NT$ Millions)

item	2022	1H 2023	2023	1H 2024
Cash and cash equivalents at the beginning of the year	1,042	1,103	1,103	1,461
Net cash generated from (used in) operating activities	253	175	138	(95)
Net cash used in investing activities	(245)	514	615	407
Net cash generated from financing activities	64	(337)	(396)	(368)
Cash and cash equivalents at the end of the year	1,103	1,464	1,461	1,445

held financial structure and debt solvency well

Financial Analysis Summary

item	2022	1H 2023	2023	1H 2024
Debts ratio%	✓ 30%	✓ 28%	✓ 28%	✓ 25%
Current ratio%	✓ 403%	✓ 397%	✗ 354%	✓ 385%
Account Receivable turnover days	✓ 135	✓ 97	✓ 123	✗ 152
Inventory turnover days	✓ 51	✗ 66	✗ 74	✗ 111
ROA%	1.23%	0.36%	-1.22%	-4.19%
ROE%	2.34%	0.50%	-2.03%	-5.57%

Adjust the business strategy and develop self-owned products.

Summary of Consolidated Balance Sheet

SPIROX CORPORATION and Subsidiaries

Summary of Consolidated Balance Sheet (In NT$ Millions)

	2022.12.31	2022.6.30	2023.12.31	2024.6.30	change
Cash and time deposits(AC)	1,226	1,597	1,554	1,451	(103)
Accounts Receivable,net	506	381	337	242	(95)
Other receivable, net	667	77	53	24	(29)
Inventories,net	172	61	74	80	6
Other current assets	114	100	83	112	29
Financial Assets(except AC)	698	837	789	371	(418)
Property, plant and equipment	623	602	616	617	1
Non-current assets	42	(18)	119	106	(13)
Total Assets	4,048	3,638	3,624	3,001	(623)
Borrowings	476	310	421	158	(263)
Contract Liabilities	95	85	83	70	(14)
Account payable	486	448	350	353	2
Other liabilities	154	191	185	163	(22)
Total Liabilities	1,211	1,034	1,027	743	(284)
Common Stock	1,187	1,187	1,150	1,150	0
Additional Paid-In Capital	618	432	437	392	(45)
Retained Earnings	1,335	1,273	1,102	919	(184)
Other Equity+Treasury Stock	(360)	(289)	(171)	(271)	(100)
Minority Interest	57	0	79	69	(10)
Total equity	2,837	2,604	2,597	2,258	(339)

Asset-Light Operation

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Summary of Statements of Consolidated Income (YoY & QoQ)

SPIROX CORPORATION and Subsidiaries

Summary of Consolidated Statements of Income (In NT$ Millions)

	23/Q2	23/Q3	23/Q4	24/Q1	24/Q2	23/H1	24/H1
Net Revenue	358	312	308	223	166	723	389
YoY	(128)	(276)	(88)	(142)	(191)	(208)	(334)
YoY%	-12.4%	-47.0%	-22.1%	-39.0%	-53.5%	-22.4%	-46.1%
Gross Profit	73	69	71	47	46	98	93
YoY	11	22	72	22	(27)	(28)	(5)
YoY%	17.3%	46.5%	7097.2%	87.4%	-37.2%	-21.9%	-5.2%
GP Margin %	20.5%	22.1%	23.1%	21.2%	27.6%	13.6%	23.9%
Operating Expenses	93	121	107	78	100	200	178
YoY	(48)	(28)	(49)	(30)	8	(85)	(22)
YoY%	-34.2%	-18.7%	-31.5%	-27.6%	8.2%	-29.7%	-11.0%
Operating Income (loss)	(19)	(52)	(37)	(31)	(54)	(102)	(85)
YoY	57	50	120	52	(35)	55	17
YoY%	74.6%	48.7%	76.2%	62.7%	-180.5%	35.2%	16.4%
Op. Income(loss) margin%	-5.4%	-16.8%	-12.1%	-13.8%	-32.7%	-14.1%	-21.9%
Non-Operating Revenue and Expenses	(25)	(74)	37	(100)	39	183	(61)
YoY	(1)	(305)	(503)	(309)	64	221	(244)
YoY%	-3.3%	-132.0%	-93.2%	-148.2%	257.1%	586.7%	-133.3%
as % of revenue	-6.9%	-23.7%	12.0%	-45.0%	23.5%	25.4%	-15.7%
Net Income (loss)	(49)	(118)	8	(112)	(14)	55	(126)
YoY	43	(228)	(325)	(215)	35	242	(180)
YoY%	46.7%	-207.2%	-97.6%	-208.3%	71.1%	129.2%	-330.3%
Net Income (loss) margin%	-13.6%	-37.8%	2.6%	-50.1%	-8.4%	27.3%	-70.6%
Net Incom (loss) attributable to :							
Owners of the Parent	(49)	(118)	7	(105)	(10)	55	(115)
Non-controlling interests	0	0	1	(6)	(4)	(0)	(10)
EPS (NT Dollars)	(0.43)	(1.03)	0.06	(0.90)	(0.09)	0.48	(1.02)

(1) A high proportion of revenue comes from Mainland China, making it significantly impacted by geopolitical factors. Business with caution, and clients are carefully selected in China.
(2) Comprehensive Lean Cost Management.

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Q & A

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Thank you.