

# Part II) AI Substrates: The Glass Age - from Commodity to Strategic AI Bottleneck

## 第二部分) AI 基板: 玻璃时代——从大宗商品到战略性 AI 瓶颈

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### GOLDMAN SACHS GS Korea Sales Commentary GS 韩国销售评论

**SEMCO (009150) +40% WoW, Ibiden (4062) +26% WoW, Samhwa Capacitor (00182) +62% WoW**

**SEMCO (009150) 周环比 +40%, Ibiden (4062) 周环比 +26%, 三和电容 (00182) 周环比 +62%**

#### The Glass Age - from Commodity to Strategic AI Bottleneck 玻璃时代——从大宗商品到战略性 AI 瓶颈

In light of a gradual transition to glass substrates, the entire substrate industry is facing a tectonic shift where a once-typical commodity has become the industry's critical manufacturing bottleneck.

鉴于向玻璃基板的逐渐过渡，整个基板行业正面临一场结构性变革：曾经典型的普通大宗商品，如今已成为行业关键的制造瓶颈。

This pivot creates a new hierarchy in the global supply chain, where the ability to manage glass brittleness and TGV precision will define the future winners.

这一转变在全球供应链中建立了一个新的层级体系，其中管理玻璃脆性和 TGV 精密度的能力将决定未来的赢家。

Advanced packaging is undergoing a structural transition towards glass substrate, primarily driven by "warpage wall"—the physical limit where organic materials can no longer support the thermal loads (over 1,000W) and bigger package sizes required for next generation AI chips. The rapid acceleration of AI inference is generating additional thermal loads, placing unprecedented stress on organic substrates, where the material deforms under heat. As a result, the longer-term direction is clearly towards "glass substrate", but there is a significant bottleneck including a global shortage of raw materials such as high-quality T-glass (90% M/S by Nitto Boseki) or copper (Berg article on copper: <https://blinks.bloomberg.com/news/stories/T8FQ55KGIFQW>), specialized laser-drilling equipments for the glass substrates, and technological barriers (micro-cracking). As seen in early cycle of HBM shortage, the ability to secure glass-specific supply chains is emerging as the new benchmark to keep the leadership in AI inference. Of note, SEMCO has already established a pilot line for glass substrate prototypes in 2025 and formed a JV with Sumitomo Chemical, aiming to speed up the production and supply of glass cores—a critical component of glass substrates.

先进封装正经历向玻璃基板的结构性转型，这主要是由“翘曲墙”驱动的——即有机材料无法再承受下一代 AI 芯片所需的热负荷（超过 1,000W）和更大封装尺寸的物理极限。AI 推理的快速加速产生了额外的热负荷，给有机基板带来了前所未有的压力，导致材料在受热时发生变形。因此，长期方向显然是向“玻璃基板”发展，但目前存在重大瓶颈，包括高质量 T-glass（日东纺 Nitto Boseki 占据 90% 市场份额）或铜（彭博关于铜的文章：<https://blinks.bloomberg.com/news/stories/T8FQ55KGIFQW>）等原材料的全球短缺、玻璃基板专用激光钻孔设备以及技术壁垒（微裂纹）。正如 HBM 短缺早期周期所见，确保玻璃专用供应链的能力正成为保持 AI 推理领导地位的新基准。值得注意的是，三星电机（SEMCO）已于 2025 年建立了玻璃基板原型试产线，并与住友化学（Sumitomo Chemical）成立了合资企业，旨在加速玻璃芯（玻璃基板的关键组件）的生产和供应。

Source: <https://www.trendforce.com/news/2026/02/03/news-samsung-reportedly-shifts-glass-substrate-project-to-business-unit-eyes-2027-ramp-up/>

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#### AI Power Consumption Uptrend AI 功耗上升趋势



Source: Goldman Sachs Global Investment Research

Ibiden (4062 JP) remains the primary substrate supplier for global AI roadmap. While maintaining a technological lead in high-layer-count substrates, Ibiden is also transitioning their R&D towards glass-core integration as well as silicon bridge to facilitate P2P (package-to-package) and D2D (die-to-die) connectivity in longer-term.

Ibiden (4062 JP) 仍然是全球 AI 路线图的主要载板供应商。在保持高层数载板技术领先地位的同时，Ibiden 也在将其研发重点转向玻璃芯集成以及硅桥技术，以促进长期内的 P2P（封装到封装）和 D2D（芯片到芯片）连接。

While Ibiden is working on ultra-dense chiplet connections, the surrounding glass core may provide the rigid "thermal frame" needed to keep the fast connection stable under high workload.

在 Ibiden 致力于超高密度小芯片 (chiplet) 连接的同时，周围的玻璃芯可以提供所需的刚性“热框架”，以保持高速连接在高工作负载下的稳定性。

GS Ibiden covering analyst, [daiki.takayama@gs.com](mailto:daiki.takayama@gs.com), has been recommending Ibiden as a core holding in ABF substrate space, as large and more complex FC packaging is needed for greater complexity/speed of inference. As Takayama-san precisely said "AI-related themes are becoming broader, deeper, and more diffuse", where there are many other investment opportunities, outside of memory space.

高盛 (GS) 负责 Ibiden 的分析师 [daiki.takayama@gs.com](mailto:daiki.takayama@gs.com) 一直推荐将 Ibiden 作为 ABF 载板领域的核心持仓，因为更大、更复杂的 FC 封装是应对更高复杂度和推理速度所必需的。正如 Takayama-san 精辟指出的那样，“AI 相关主题正变得更广、更深、更分散”，在存储领域之外，还存在许多其他的投资机会。

#### 2026 Asia Tech Outlook Report from GS Japan: <https://marquee.gs.com/content/research/en/reports/2026/01/12/8d579a12-8c23-4828-a311-51968724c6b5.html>

高盛日本 2026 亚洲科技展望报告：  
<https://marquee.gs.com/content/research/en/reports/2026/01/12/8d579a12-8c23-4828-a311-51968724c6b5.html>

SEMCO (009150 KS): From Takeyama's report - "In AI servers, as power consumption and voltage rise, and owing to differences in the operating characteristics of GPUs/CPUs, fluctuations (swing) in power/voltage are being amplified. In this context, we expect rapid expansion in demand for various capacitors, which function to temporarily store and release electricity to stabilize circuits."

This is well summarized which will benefit companies like Murata (6981 JP), SEMCO (009150), and Taiyo Yuden (6976 JP). Also, SEMCO is navigating a high-stakes transition to scale glass substrate production, where the industry roadmap is technically still "undefined." The undefined nature of the roadmap is due to the lack of industry-wide standardization and "micro-cracking" nature of glass, causing complexity to capacity expansion.

SEMCO (009150 KS): 摘自 Takeyama 的报告——“在 AI 服务器中，随着功耗和电压的升高，且由于 GPU/CPU 运行特性的差异，电流/电压的波动（摆幅）正在被放大。在这种背景下，我们预计各类电容器的需求将快速扩张，其功能是临时存储和释放电能以稳定电路。”这一总结非常到位，将使村田制作所 (6981 JP)、SEMCO (009150) 和太阳诱电 (6976 JP) 等公司受益。此外，SEMCO 正在进行一场高风险的转型，以扩大玻璃基板的生产规模，而该行业的路线图在技术上仍处于“未定义”状态。路线图的不确定性源于缺乏全行业标准化以及玻璃易产生“微裂纹”的特性，这为产能扩张增加了复杂性。

2026 is the era glass substrates of "beta-stage" products where the industry leaders may continue to benefit from technological edges in laser-drilling equipments (+ve SEMCO thru Samsung Display), customer diversification and raw material supplies. The substrate space is experiencing a structural shift in pricing power where the bottlenecks in raw materials (T-glass, ABF film) and the technical complexity of next-generation architectures are transforming substrates from "commodity components" into "strategic bottlenecks." This shift many continue to have an impact on the expansion of product ASP for leaders like Ibiden, SEMCO, and the major Taiwanese players (Unimicron, Nan Ya PCB).

2026 年是玻璃基板进入“测试阶段”产品的时代，行业领导者可能会继续受益于激光钻孔设备（SEMCO 通过三星显示受益）、客户多样化和原材料供应方面的技术优势。基板领域正在经历定价权的结构性转变，原材料（T-玻璃、ABF 膜）的瓶颈以及下一代架构的技术复杂性，正在将基板从“大宗商品组件”转变为“战略瓶颈”。这种转变可能会持续影响 Ibiden、SEMCO 以及台湾主要厂商（欣兴电子、南亚电路板）等领先企业的平均销售价格（ASP）扩张。

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主题: 三星电机 (SEMCO) 在获得 11 亿美元订单后股价上涨 8%, 成为 AI 供应链的核心支柱

#### GOLDMAN SACHS GS Korea Sales

SEMCO +8% after securing \$1.1bn contract, emerging as a Core Pillar in the AI supply chain

三星电机 (SEMCO) 在获得 11 亿美元订单后股价上涨 8%, 成为 AI 供应链的核心支柱

What's NEW: SEMCO announced a supply agreement (W1.5trn / \$1.1bn) for silicon capacitors with a major global technology firm.

最新动态: 三星电机宣布与一家全球主要科技公司签署了硅电容器供应协议 (1.5 万亿韩元 / 11 亿美元)。

What's the DETAILS: According to a regulatory filing, the contract will run for two years (Jan 2027-Dec 2028). The primary product, the silicon capacitor, is a sophisticated component integrated within high-performance semiconductor packages, such as GPUs for AI servers and HBM, to ensure ultra-fast data processing and power stability.

详情如下: 根据一份监管文件, 该合同期限为两年 (2027 年 1 月至 2028 年 12 月)。核心产品硅电容器是一种集成在高性能半导体封装 (如 AI 服务器 GPU 和 HBM) 中的尖端组件, 旨在确保超高速数据处理和电源稳定性。

Why it MATTERS: SEMCO is the key company which solves the AI power bottleneck

重要意义: 三星电机 (SEMCO) 是解决 AI 电力瓶颈的关键公司。

Technical Superiority: Silicon capacitors offer 100x lower resistance compared to traditional MLCCs, providing the extreme voltage stability packages.

技术优势: 与传统的 MLCC (片式多层陶瓷电容器) 相比, (ESL) 显著降低, 能够为高性能 AI 服务器封装提供所需的

Market Entry: a landmark \$1.1bn supply contract with a major U.S. bi breakthrough into the global High-Performance Computing (HPC) oligo

市场准入: 与美国某大型科技巨头签订的这份价值 11 亿美元入全球高性能计算 (HPC) 寡头市场的重大突破。

Strategic Milestone: This deal validates SEMCO's ultra-fine processing, diversifying its portfolio into autonomous driving and premium mobile

战略里程碑: 这笔交易验证了 SEMCO 在超精细加工领域的自动驾驶和高端移动 AI 领域多元化发展的催化剂。

What's the BACKGROUND: As generative AI infrastructure expands, the resulting surge in data processing has led to a corresponding spike in power consumption. The competitive advantage of silicon capacitors lies in their ultra-low resistance - by reducing resistance more than 100 times compared to traditional MLCCs, these components minimize signal loss, leading to more stable performance even under extreme computing condition of high voltage and high temperature.

背景信息: 随着生成式 AI 基础设施的扩张, 由此产生的数据处理激增导致功耗相应飙升。硅电容器的竞争优势在于其超低电阻——通过将电阻降低到传统 MLCC 的百分之一以下, 这些组件能够最大限度地减少信号损耗, 从而在高电压和高温的极端计算条件下实现更稳定的性能。

Source: <https://www.nocutnews.co.kr/news/6520195>

来源: <https://www.nocutnews.co.kr/news/6520195>

#### SEMCO's outperformance vs. KOSPI GR SEMCO 表现优于 KOSPI 指数增长率



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