

Interview with LSSM: Innovating Semiconductor Testing with Silicon Nitride Solutions



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This interview, conducted by Juliana Lee & Partners (JL&P), provides insights into the vision and expertise of LSSM Co., Ltd., a pioneering company in semiconductor testing solutions. We spoke with LSSM's CEO, Ahn Hee-seok, who shared detailed responses in a written format about the company's journey, achievements, and future plans. LSSM specializes in producing silicon nitride substrates and precision laser-drilled probe guides essential for semiconductor measurement equipment.

Q Can you introduce LSSM Co., Ltd. to us?

LSSM Co., Ltd. is a professional manufacturing venture company that specializes in producing silicon nitride substrates and precision laser-drilled probe guides, essential components in semiconductor measurement equipment.

Through proprietary material compositions, cost-effective manufacturing, and innovative processing, we've developed silicon nitride substrates that not only match, but surpass, the quality of our global competitors' offerings. Our products excel in investment efficiency and processing cost, allowing us to price competitively while delivering high-quality materials. This technological edge has positioned us to start commercializing globally with the goal of becoming a leading player in semiconductor testing materials.

? What inspired you to start LSSM Co., Ltd.?

With over 25 years in materials science, my focus has been on advanced ceramics and metal composites, developing and commercializing both raw materials and high-precision bonded components. It was during this time that we received a request from a partner company in semiconductor equipment, urging us to localize the production of probe guides—a key component in semiconductor measurement tools monopolized by global firms.

This coincided with explosive advances in 5G and AI technologies in recent years, which have driven unprecedented demand for high-performance (high integration, high frequency, ultra-fast) system semiconductors. To test these high-spec chips, probe cards are essential, and within them, probe guides with ultra-fine, square-patterned holes play a crucial role. Creating these ultra-precise square holes isn't feasible with conventional machining; only laser processing can handle the demands. Moreover, Japan's machinable ceramics used previously are inadequate for this laser application. The market has rapidly shifted to silicon nitride ceramics, which alone possess the high strength, thermal shock resistance, and fracture toughness needed for reliable processing.

However, silicon nitride ceramics present significant manufacturing challenges, especially in meeting the high technical specifications required for semiconductor testing. With complex production processes that demand high temperatures and pressures, only a few global companies dominate this market, making prices high and productivity low.

LSSM set out to break this dependency on high-cost, high-temperature methods. By developing our proprietary compositions and refining a lower-cost, lower-temperature manufacturing approach, we could produce silicon nitride substrates of equal or superior quality. Our goal was not only to localize this critical material but also to capture a leading share in the fast-growing market for probe guides in high-spec semiconductor measurement equipment. Beyond this, we envisioned pioneering new applications and markets for silicon nitride substrates—areas where cost had previously been prohibitive. By strengthening the overall industrial supply chain and advancing related technologies, we aim to become a global leader in this specialized field.

? Have there been challenges along the way?

Yes. Silicon nitride, being an inherently difficult material to process due to its high resistance to sintering, required us to invest considerable time and resources into developing our own unique material compositions and low-cost manufacturing processes to meet the stringent specifications demanded by high-end semiconductor testing equipment. As a startup, securing the necessary funding and assembling a skilled team was challenging, especially in sourcing stable, reliable partners with the technical ability for tasks like thin substrate processing and laser machining.

Initially, our plan was to establish a strong foothold in the domestic market for semiconductor testing equipment before expanding internationally. However, the shift within the domestic market from traditional memory to high-performance semiconductors has been slower than anticipated, pushing us

to accelerate our overseas expansion. Competing internationally, however, introduced its own hurdles; our brand recognition was relatively low compared to established global firms, making it difficult to build momentum in foreign markets.

❓ How did you overcome these challenges?

We leveraged the expertise of our senior team members, who have over 25 years in ceramic and metal materials development. This foundation, combined with support from government R&D grants, enabled us to refine our proprietary low-cost, high-quality silicon nitride substrate technology. Years of persistence also led to building a solid network of reliable partners skilled in thin substrate processing and laser machining.

Financial support from organizations like the Korea SMEs and Startups Agency(KOSME), Gumi Electronics & Information Technology Research Institute helped us establish an early foundation for commercialization. We also worked with recruitment platforms and partner companies to address the challenges of hiring specialized startup talent.

More recently, we successfully formed a strategic partnership with a mid-sized domestic company in the semiconductor testing sector. This collaboration has opened access to their international sales networks, helping us to identify foreign clients, secure product certifications, and expand our overseas presence. Additionally, we have partnered with a consulting firm experienced in global semiconductor markets, which has allowed us to gain traction with top-tier clients worldwide, secure contracts, and attract international investment.

❓ Could you share LSSM's achievements and future plans?

We've achieved a major milestone by developing high-performance silicon nitride substrates with a unique low-temperature, low-pressure, and cost-effective process—an alternative to the high-cost, high-pressure methods traditionally used by global firms. This approach has enabled us to reduce initial equipment and operational costs by 66% and cut production costs and pricing by over 40%. Alongside securing patents and forging an extensive network of collaborators, we've also contributed to the broader industry's resilience and competitiveness by decreasing reliance on conventional technology.

Our substrates have passed rigorous quality assessments from both domestic and international laser processing and probe card companies, allowing us to certify products and initiate orders with top-tier semiconductor measurement firms globally. To enhance our international market presence and competitiveness, we are actively investing in in-house laser processing equipment, expanding product sizes, and developing next-generation multi-junction probe guides.

Our growth strategy includes a phased approach to investment and hiring, aiming to increase revenue from 450 million KRW (\$337,500 USD) in 2025 to 15 billion KRW (\$11.25 million USD) by 2027 and 57 billion KRW (\$42.75 million USD) by 2029, culminating in an IPO.

We're also working to scale up by tapping into high-growth markets and developing advanced products, such as test boards for FC-BGA BBT testing, large-diameter substrates for burn-in testing, and probe cleaners. By 2029, we expect revenue from these sectors to reach 56 billion KRW (\$42 million USD), helping push our total revenue target to 113 billion KRW (\$84.75 million USD).

Looking ahead, we aim to continue pioneering in silicon nitride ceramic technology and expand into new application areas. We're developing high thermal shock-resistant heaters for semiconductor equipment

and hydrogen fuel cell modules, a solution utilizing our advanced ceramic-metal printing techniques. This ongoing innovation will not only sustain our business but also establish LSSM as a global leader in silicon nitride ceramic applications.



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