



FOR IMMEDIATE RELEASE:

Bulk GaN: from technology to market

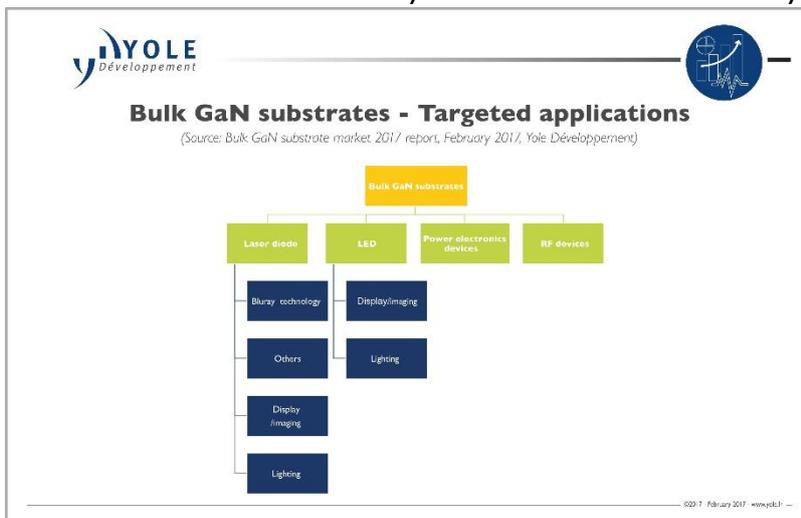
Bulk GaN Substrate Market report – Yole Développement – February 2017

LYON, France – February 21, 2017: “The past 30 years has witnessed the impressive progress of GaN-based technology in various fields”, comments **Dr Hong Lin, Technology & Market Analyst at Yole Développement (Yole)**. The “More than Moore” market research and strategy consulting company, Yole released today a new technology and market report focused on Bulk GaN substrate, titled [Bulk GaN Substrate Market](#). Under this new analysis, the consulting company presents the different market segments and related drivers and details the status of GaN technologies today.

Commercial GaN-based devices are available for both optoelectronic and electronic applications, confirm Yole’s analysts. Indeed optoelectronics applications, particularly GaN-based laser diodes and GaN-on-GaN LEDs, are expected to drive the bulk GaN substrate market from 2016 - 2022.

Specific to the laser diode market, the Blu-ray segment, which in the past was the GaN-based laser industry’s main driver, continues to decline. In recent years, a much greater percentage of movies were viewed via streaming than on optical discs, and in many cases flash memory is replacing optical discs and magnetic storage. The current crop of mobile phones, netbooks, tablets, and even laptops lack a Blu-ray/DVD/CD drive. UHD¹ Blu-ray’s recent development is expected

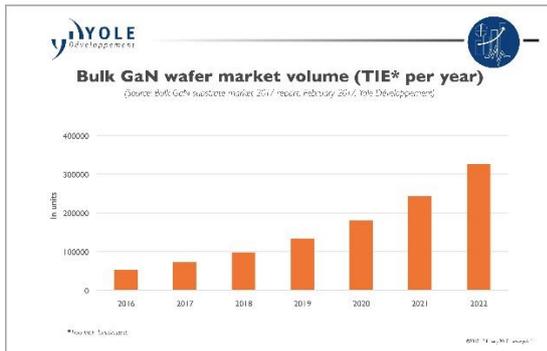
to have only a novelty effect on sales - not enough to reverse the general downward trend identified in the coming years. However, decreasing Blu-ray demand is expected to be offset by nascent, growing segments like projectors including office projector, mobile pico projector, HUD², etc... And automotive lighting, leading to new growth opportunities for bulk GaN substrates.



¹ UHD : Ultra HD
² HUD : Head-Up Display

In the LED market, improvements in GaN substrate manufacturing have lowered substrate prices enough for various niche LED applications. In addition to Sora (US) and Panasonic (JP), this seems to have revived the interest of other LED manufacturers which are beginning to seriously consider using GaN substrates for either spotlighting or automotive lighting. New GaN-on-GaN LED players are expected in the market in the coming years.

In this context, Yole's analysts expect laser diodes and LEDs to drive continuous growth of bulk GaN substrate demand.



In 2016 the bulk GaN substrate market was estimated at about 60K wafers (Two Inch Equivalent (TIE)). “Essentially all commercial GaN wafers are produced by HVPE³ technology, but details of the growth process and separation techniques vary by company,” asserts Dr Lin from Yole. Other techniques, such as Na-flux or Ammonothermal, are still under development. “At Yole, we still do not see large volume of these wafers on the market”, confirms Dr Lin. And the market is expected to grow at a 10% CAGR between 2017 and

2022 to reach more than US\$ 100 million in 2022.

What about the Japanese players? The current GaN substrate market is heavily concentrated. More than 85% share is held by three Japanese firms: Sumitomo Electric Industries (SEI), Mitsubishi Chemical Corporation (MCC) and Sciocs. The Japanese companies are clearly dominating the bulk GaN substrate market, confirms Yole in its Bulk GaN report. However other Japanese and non-Japanese players are still in small-volume market production or at the R&D stage: it is too early today for them to challenge these market leaders...

[Yole's Bulk GaN report](#) provides a complete summary of GaN laser diode and GaN-on-GaN market data, including Blu-ray, laser office projectors, pico-projectors, HUD, automotive lighting, and more. It also conveys a detailed analysis of GaN-on-GaN power and RF applications. This analysis outlines Yole's understanding of the market's current dynamics and future evolution, covering technical and economic aspects. A detailed description of this report is available on i-micronews.com, [Compound Semi. reports section](#).

Yole's analysts are covering all year long the compound semiconductor field with its technologies and applications. SiC, GaN, GaN-on-Si... all WBG⁴ solutions and their market segments are detailed in numerous technology & market reports, [webcasts](#) and presentations performed at key trade shows and conferences. CS International and IWBGPEAW 2017 are part of Yole's 2017 program:

- [CS International](#): GaN RF industry: landscape and future evolution - March 8th at 9:25 AM Zhen Zong, Compound Semi. & Power electronics Technology & Market Analyst at Yole Développement
- [International Wide Bandgap Materials \(WBG\) Power Electronics Applications Workshop](#) – IWBGPEAW, on May 22 & 23. To learn more about detailed agenda & sponsorships: Camille Veyrier (Veyrier@yole.fr).

Make sure you will be there to attend Yole's presentations and panel sessions. Stay tuned!

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³ HVPE : hydride vapor-phase epitaxy

⁴ WBG : Wide Band Gap



About [Bulk GaN substrate market](#) report

Laser diodes and high-brightness LEDs are driving the bulk GaN substrate market

▪ Author:

Dr. Hong Lin works at Yole Développement, the "More than Moore" market research and strategy consulting company, as a technology and market analyst since 2013. She is specialized in compound semiconductors and

provides technical and economic analysis. Before joining Yole Développement, she worked as R&D engineer at Newstep Technologies. She was in charge of the development of cold cathodes by PECVD for visible and UV lamp applications based on nanotechnologies. She holds a Ph.D in Physics and Chemistry of materials.

▪ Companies cited in the report:

AmberWave, AMD, Ammono Avogy, Freiberger, Fuji Electric, Furukawa, GaN Systems, Kyma, LG Electronics, Lumilog, MicroVision, Mitsubishi Chemical, Mitsubishi Electric, Nanowin, NGK Insulators, Nichia, Nintendo, Nitek, NTT, Osram Opto Semiconductors, Panasonic, Plansee, Powdec, Qmat, Saint-Gobain, Seoul Semiconductor, Sharp, Sino Nitride, Soitec, Sony, Soraa, Sumitomo SEI, Texas Instruments, TopGaN, and moreand many more...

About Yole Développement – www.yole.fr

Founded in 1998, Yole Développement has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole Développement group has expanded to include more than 50 collaborators worldwide covering MEMS, Compound Semiconductors, LED, Displays, Image Sensors, Optoelectronics, Microfluidics & Medical, Advanced Packaging, Manufacturing, Nanomaterials, Power Electronics and Batteries & Energy Management.

The "More than Moore" company Yole, along with its partners System Plus Consulting, Blumorpho and KnowMade, support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business.

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