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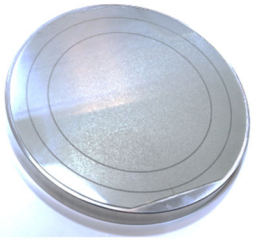
News Release

AGC Increases Investment in Next-generation Power Semiconductor Material Developer Novel Crystal Technology

— Further accelerating the commercialization of gallium oxide wafers —

Tokyo, February 21, 2022 -AGC Inc.(AGC), a world-leading manufacturer of glass, chemicals and high-tech materials, has accepted a portion of a third-party allocation of new shares issued on February 21 by Novel Crystal Technology, Inc. (NCT), a company engaged in developing a next-generation power semiconductor material.

100mm gallium oxide substrate
(currently on the market)



150mm gallium oxide substrate
(under development)

Power semiconductors are electronic components that function to control electric power. They are found in a wide range of electric and electronic devices such as servers, automobiles, industrial machinery, and home appliances. Since the performance of power semiconductors directly impact the energy saving, weight reduction and miniaturization of power control modules, the performance requirements for these devices is increasing year by year. As such there is a need for semiconductor materials with lower power loss and superior voltage resistance and large current characteristics compared to silicon, the conventional material.

Gallium oxide is a next-generation power semiconductor material with a power semiconductor figure of merit [*1] of more than 3,000 times that of silicon. It is also attracting considerable attention because it has the potential to be used at even higher voltages and currents than other materials being explored, such as SiC (silicon carbide) and GaN (gallium nitride).

To date, NCT has succeeded in developing, manufacturing, and selling gallium oxide wafers of up to 100mm, and has a global share of nearly 100%. AGC has been working on joint development and investing in NCT since 2018, based on the idea that NCT's high technology and AGC's inorganic material mass-production technologies, such as high-temperature melting, polishing processing, and cleaning cultivated through glass manufacturing, would enable mass production of gallium oxide at an early stage. With this third follow-on investment, AGC and NCT will further accelerate their activities toward the commercialization of gallium oxide wafers by 2023.

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Under its ***AGC plus 2.0*** management policy, the AGC Group has positioned Electronics as one of its strategic businesses. AGC will continue making aggressive development efforts and investment in semiconductor-related business, which is expected to continued significant growth in demand, and thus contribute to the advancement of the semiconductor industry.

< Notes >

*1: Baliga figure of merit; assuming silicon is 1, gallium oxide is estimated to be 3,444. Please refer to the table below for details.

< Reference >

■About Novel Crystal Technology, Inc.

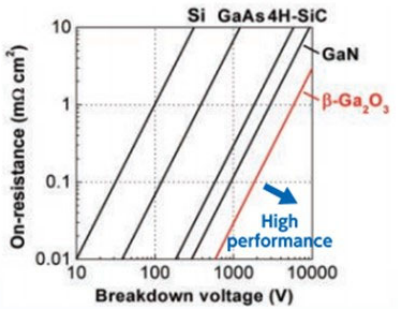
Novel Crystal Technology, Inc. (NCT) was established as a 'carve-out' venture from the Tamura Corporation and a technology transfer venture from the National Institute of Information and Communications Technology (NICT) in June 2015. NCT is engaged in the development, manufacture, and sale of gallium oxide single crystal substrates and epitaxial films, which are used as power semiconductor materials as well as the development of power devices. In November 2017, NCT, in collaboration with Tamura Corporation, successfully developed the world's first trench MOS-type power transistor made with gallium oxide epitaxial film. The company is focusing efforts on being a world pioneer in the practical application of gallium oxide based power semiconductors.

https://www.novelcrystal.co.jp/eng/

■Physical properties of next generation power semiconductor materials

	Silicon (Existing material)	SiC (4H)	GaN	β-Ga2O3
Baliga figure of merit	1	340	870	3,444 (estimate)
Band gap (eV)	1.1	3.3	3.4	4.8
Breakdown voltage (MV/cm)	0.3	2.5	3.3	8 (estimate)

The higher the Baliga figure of merit, the lower the on-resistance when the device is driven.



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