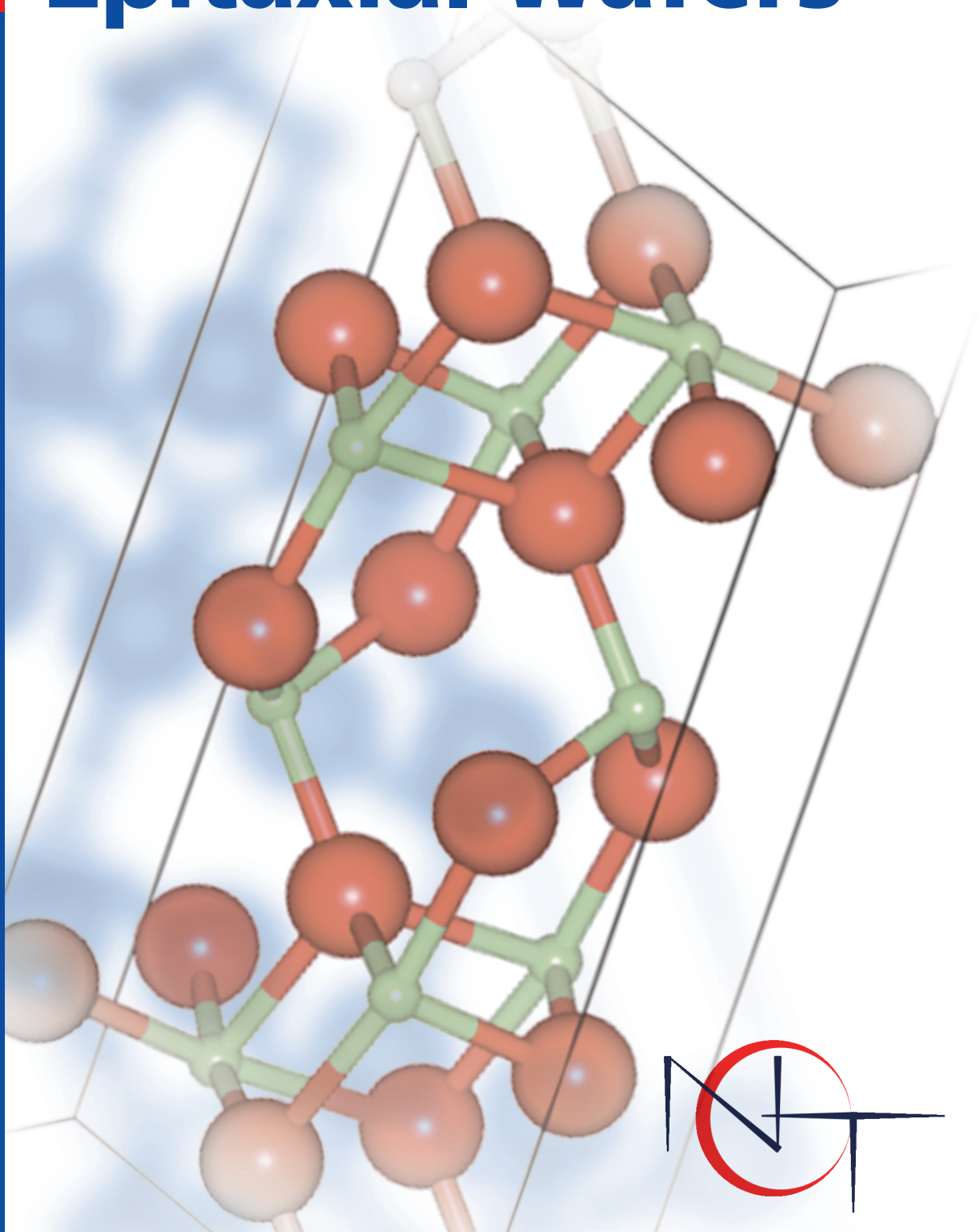
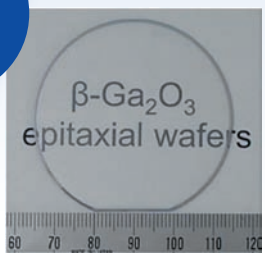
Gallium Oxide (Ga_2O_3) Substrates and Epitaxial Wafers



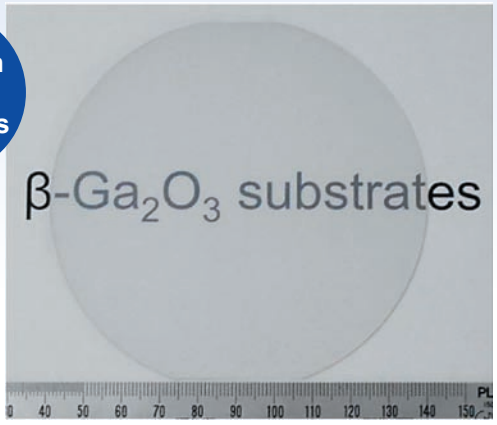
Novel Crystal Technology, Inc.

Gallium oxide (Ga_2O_3) has a large band-gap energy, and it can be grown from a melt source. As a result, large, high-quality single-crystal substrates can be manufactured at low cost. These characteristics make Ga_2O_3 a promising material for next-generation power electronics.
In fact, Ga_2O_3 is potentially superior to GaN and SiC for power device applications.

Two-inch Ga_2O_3 epitaxial wafers



Four-inch Ga_2O_3 substrates



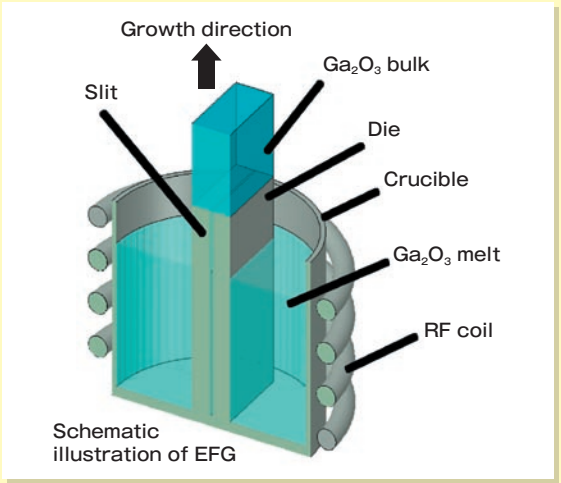
■Electrical characteristics

	Si	4H-SiC	GaN	Diamond	β-Ga_2O_3
Band gap : *Eg* (eV)	1.1	3.3	3.4	5.5	**4.8-4.9**
Breakdown field : E_c (MV/cm)	0.3	2.5	3.3	10	**8 (est.)**
Electron mobility : μ (cm^2/Vs)	1,400	1,000	1,200	2,000	**300 (est.)**
Dielectric constant : ε_s	11.8	9.8	9.0	5.5	**10**
Baliga's FOM*1 : $\varepsilon\mu E_c^3$	1	340	870	24,664	**3,444**

*1: An index of the performance of power device materials

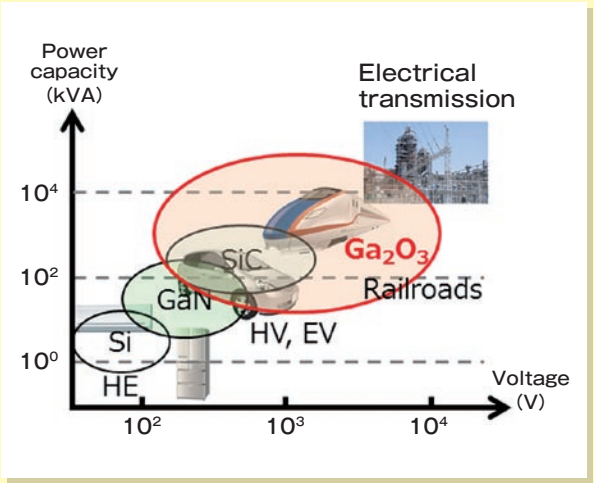
Ga_2O_3 has a larger Baliga's FOM*1 than those of SiC and GaN.

■Method of growing bulk single crystals



Ga_2O_3 bulk single crystals are grown in an edge-defined film-fed growth (EFG) process. The growth rate is high with this method, and it is easy to make large-diameter substrates.

■Applications



Ga_2O_3 has a wide range of industrial applications, such as in power conditioners of inverters for driving the motors of electric vehicles and trains and in next-generation electrical power transmission systems.

Contact details for inquiries

Novel Crystal Technology, Inc.
2-3-1 Hirosedai Sayama-shi Saitama 350-1328
TEL.+81-4-2900-0072 FAX.+81-4-2900-0059
http://www.novelcrystal.co.jp/ mail:sales@novelcrystal.co.jp

Novel Crystal Technology, Inc. is a 'carve-out' venture from Tamura Corporation.