Next Generation
Wide & Ultrawide Bandgap
Semiconductor Technologies

Crystalline Substrates

Semiconductor Devices

Crystal Growth
Equipment

Large Area Templates
Technical Core Competencies

- Vapor Phase Crystal Growth Process Modeling & Simulation
- Vapor Phase Crystal Growth Equipment Design & Fabrication
- Crystalline Materials Growth & Fabrication
- Crystalline Materials Characterization
- Semiconductor Device Design & Fabrication
- Semiconductor Device Test & Evaluation

Products & Services

Advanced Crystal Growth Equipment

- KVPE™ Hydride Vapor Phase Epitaxy Growth System for GaN and Ga$_2$O$_3$
- KPVD™ Plasma Vapor Deposition Growth System for AlN & Other Materials
- External Metal-Halide Sources
- Custom Crystal Growth Systems & Components

Advanced Crystalline Materials

- GaN & Related III-N Materials
- Ga$_2$O$_3$ & Related III$_2$O$_3$ Materials
- Graphene & Related Materials
- Crystalline Cu & Related Materials

Advanced Semiconductor Devices

- Vertical GaN Photoconductive Semiconductor Switch (PCSS)
- Lateral GaN PCSS
- GaN FINFET

Advanced Engineering Services

- Crystal Growth Process Modeling
- Device Performance Modeling
- Specialty Parts Manufacturing
- Wafer Fabrication & Reclaim

Kyma owns or licenses >30 patents mostly covering the growth and fabrication of III-N materials & devices but also diamond coated wire and electromagnetic field sensor technology.
Federal Contract Supported New Products in Development

GaN-on-Diamond Templates
- For Improved Thermal Impedance for Advanced GaN Electronics
- Direct GaN Growth on Polycrystalline Diamond with Novel Buffer
- Supported by Navy under Contract No. N00178-17-C-0004

High Power & Speed Photoconductive Semiconductor Switch (PCSS) Devices
- Many Applications Beckon and Phase I will Identify Potential Early Adopters
- Leveraging Kyma’s KO-GaN™ & KO-Switch™ Technologies
- Supported by Air Force under Contract No. FA3002-19-P-A006

Large Area GaN Substrates from Engineered Seeds
- For Low Cost High Performance Vertical Power Electronics
- Leveraging Kyma HVPE Growth Technology & Qromis’ Engineered Seeds
- Supported by Navy under Contract No. N68335-18-C-0332

Large Area AlGaN Substrates from Engineered Seeds
- For Next Generation AlGaN Device Development
- Leveraging Kyma HVPE Growth Technology & Qromis’ Engineered Seeds
- Supported by Air Force under Contract No. FA8650-18-C-5040

Gallium Oxide Epiwafers for Vertical Power Electronics
- For Development of 20kV+ Power Electronics
- Leveraging Kyma HVPE Growth Technology for Thick Epiwafer Growth
- Supported by Air Force under Contract No. FA9550-17-P-0012

Large Area Electronic Grade Diamond Wafers
- For Development of Diamond Based RF & Power Switching Devices
- Leveraging Kyma’s Seed Preparation Technology
- Michigan State University is Diamond Crystal Growth Partner
- Supported by Army under Contract No. W911QX-18-C-0005
Kyma’s Two Facilities in the Research Triangle Region

Kyma Headquarters & Crystal Growth & Characterization Facility (8,000 ft²)

- 8829 Midway West Road, Raleigh, NC 27617

Kyma Materials Fabrication & Device Test Facility (5,000 ft²)

- 8801 Midway West Road, Raleigh, NC 27617

Recent News Featuring Kyma’s Technologies

- *Kyma Demos 100mm Free-Standing GaN With Qromis*, Compound Semiconductor Magazine, 13 Nov 2017, [https://compoundsemiconductor.net/article/102899/Kyma_Demos_100mm_Free-Standing_GaN_with_Qromis](https://compoundsemiconductor.net/article/102899/Kyma_Demos_100mm_Free-Standing_GaN_with_Qromis)

Recent Scientific Publications Featuring Kyma’s Technologies

- Ultrawide-Bandgap Semiconductors: Research Opportunities and Challenges, J.Y. Tsao et al., [https://doi.org/10.1002/aelm.201600501](https://doi.org/10.1002/aelm.201600501)