



MATERIALS THAT MATTER

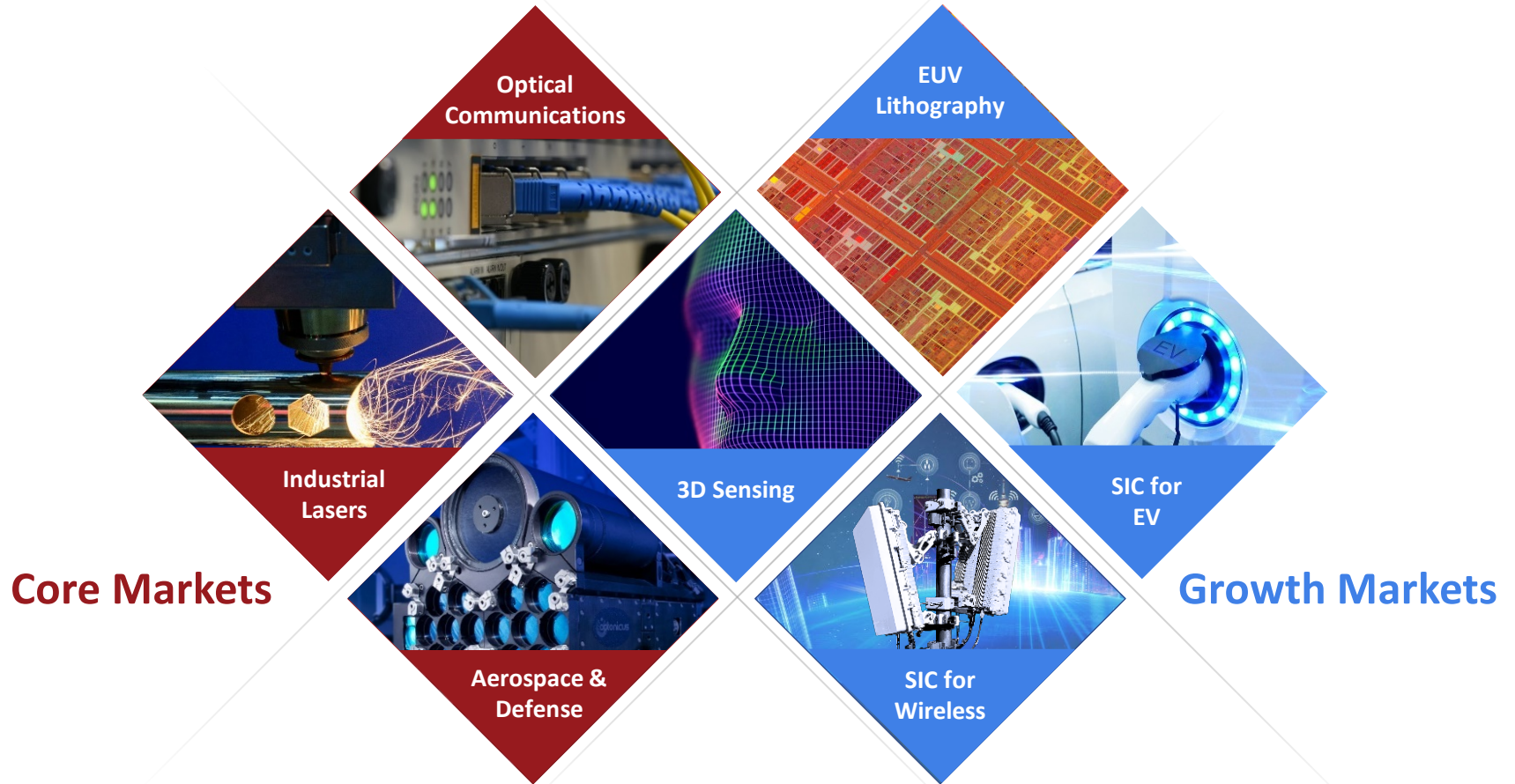
Optical Substrates for 20kW+ Applications

EPIC

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Kyle Branigan, NPI Manager

Our Core & Growth Markets



Aspheric Sapphire Lenses

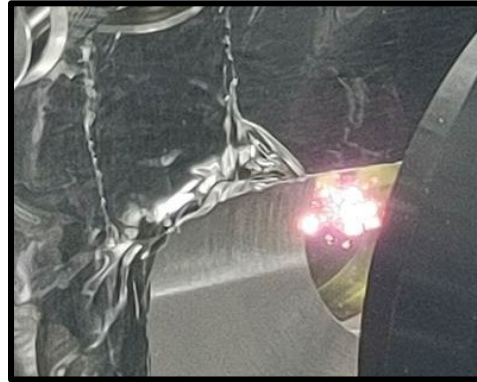
Material Advantages

- 20x Thermal Conductivity of FS
- Harder
- Refractive Index

Performance Advantages

- Contamination Tolerant
 - Less than half the thermal focal shift of FS for the same contamination
- Power Level
 - Tested to 20kW, without a cleanroom
- Lifetime
 - appx. 2.5x, application dependent
- Time-Constant
 - Process Stabilizes 9x quicker

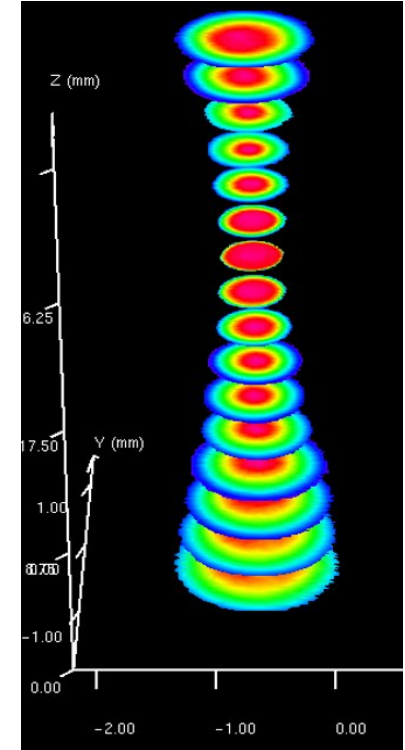
[White Paper Link](#)



Molten Aluminum on Sapphire Lens



Sapphire Asphere

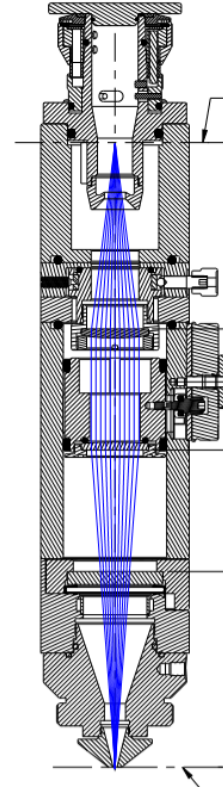


Flat Top Focal Spot (267mm FL and 100mm collimator)

Maximizing Utility

- **What is your total cost of ownership?**
 - Downtime
 - Calibration
 - Process Stabilization
 - Process Window
 - Rebuild costs
 - Replacement Parts
 - Labor
 - Shipping
 - Extra Heads

“It doesn’t matter how your part performs out of the box, it matters how it performs when your machine is running”



II-VI

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Material Property Comparison

	Sapphire	ZnS	FS (7979)
Transmission (um)	0.2-5	0.5-10	0.19-2
Index @ 1.06 um	1.75	2.29	1.45
dn/dT x(10 ⁻⁶ /C)	13	41	9.8
CTE x(10 ⁻⁶ /C)	~5	~6.5	~0.57
Absorption @ 1.06 um (ppm/cm)	50-3000	~200	~1
Scatter (/cm)	~0%	2%	~0%
Thermal Conductivity (W/m/K)	27	27	1.38
Hardness (kg/mm ²)	1500	150	522