Sapphire Business Overview & GT Material Characterization Study: Impact of Sapphire Material on LED Wafering

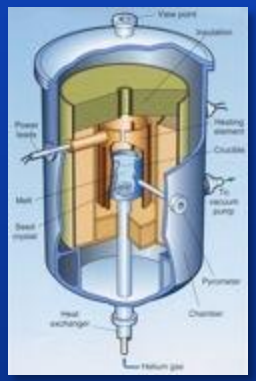
Forward Looking Statement

- This presentation contains information about management's future expectations, plans and prospects of our business that constitute forward-looking statements for purposes of the safe harbor provisions under The Private Securities Litigation Reform Act of 1995.

- Please see final slide for additional information regarding these statements.

Dual-Focus Sapphire Strategy in HB-LED Market

Sapphire Crystal Growth Furnaces



GT Products

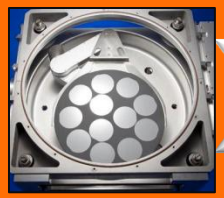
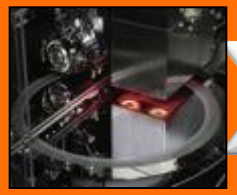
- ***Equipment Supplier***: GT Advanced Technologies sells advanced sapphire crystal growth furnaces (ASF™)
  - *$944M ASF Backlog (as of Aug 25, 2011)*
- ***Materials Supplier***: GT Advanced Technologies sells sapphire cores into the LED market, primarily for high-brightness applications

Boule Growth | **Core Fabrication**

Sapphire Fabrication

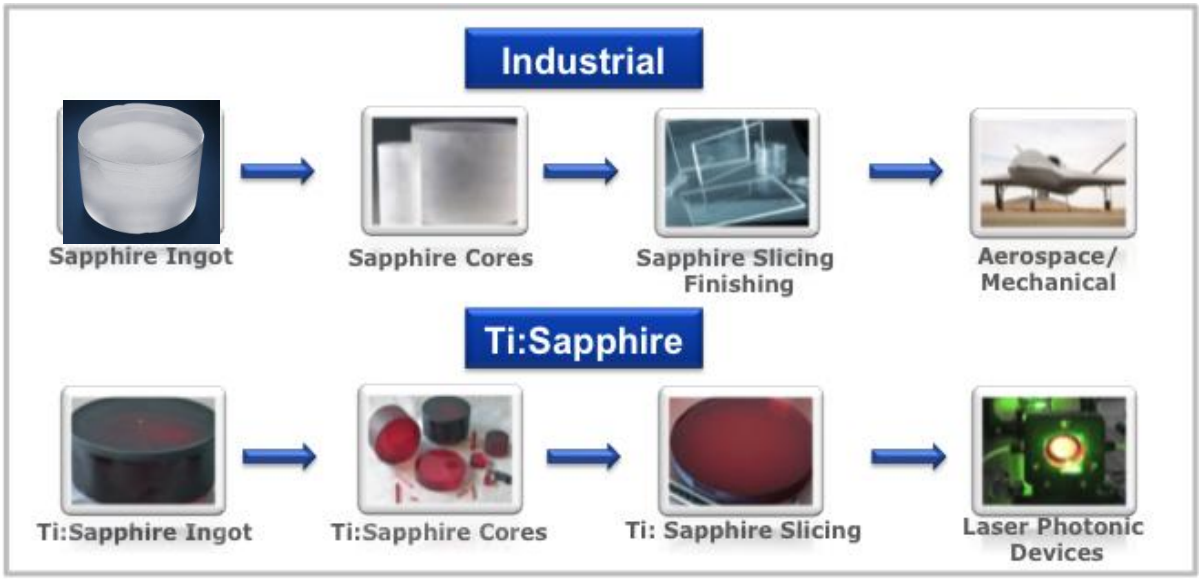
GT Products

Downstream LED Operations (no current participation by GT)

Sawing/Lapping/ Polishing/Packaging	MOCVD	LED Fab/Die Dicing	Finished LED
			
Epi-Ready Wafer Fabrication	**Epi Wafer Fabrication**	**LED Chip Fabrication**	**Assembly**

Industrial Markets for Materials Business

GTAT also supplies sapphire materials in various forms – from cores to finished products – to other industrial markets, many of which have much higher quality standards than the LED market.



Notable Recent Industrial Markets Business

- Large Optical Sapphire Blank for Gravitational Wave Telescope
- Large area C-axis (8”x10”) windows shipped for leading electro-optical systems
- 3-yr contract w/ a leading supplier to aerospace industry for large A-axis windows
- Beat 8-year incumbent for C-axis 20in^2 material for aerospace navigation system

Deep Technical Expertise, Broad Customer Relationships

- Since 2000, CSI has sold sapphire to 900+ different customers, many of whom are leaders in:
  - LED's
  - Lasers
  - Aerospace
  - Energy
  - Medical
  - Advanced research centers
- < 0.5% customer returns over the past 10 years
- Supplying sapphire to the LED industry for over a decade
- In FY11, CSI was considered a small player in overall industry capacity (<10%), yet had >30%(1) share of 6" diameter LED core shipments

(1) Actual GT Advanced Technologies FY11 6"core shipments for LED applications as % of WW 6" core shipment estimates by Canaccord Genuity and Yole Développement (Sapphire Market 2010 Q4 Report)

ASF™ Proven to Grow Large Boules, Large Diameter Cores

Pictured Above: 130kg and 100kg boule grown in GT's Salem, MA Factory

ASF Capable of Growing Large Boules

- GT currently producing 100kg & 130kg boules in Salem factory
- Cycle times for 100kg and 130kg generally the same
- Diameters up to 15"; height up to 13"

GT is Shipping Large Diameter Cores

- Shipping 2", 4" and 6" sapphire cores.
- Sampling 8" cores

In Q1FY12, >80% of GT's LED shipments were 4" diameter or larger

GT Supplies Material to Top LED Wafer Makers

GT Supplies Sapphire to 6 of the top 10 LED Wafer Makers in the World

Top 10 LED Wafer Makers in the World*

2011 Rank	Company	Country
1	CrystalOn	Korea
2	Iljin Display	Korea
3	Crystal Applied Tech	Taiwan
4	Lanjing Science & Techniques	China
5	Crystal Wise	Taiwan
6	Monocrystal	Russia
7	Tera Xtal	Taiwan
8	Kyocera	Japan
9	Namiki	Japan
10	Silian	China

*Source: Yole Développement, Sapphire Market 2010, Q4 Update

Notable Q2FY12 LED Material Activity

- GT material has been qualified by a leading high brightness device maker
- $2.3M order for 6” dia LED cores from a top 10 epi-ready wafer maker
- Large dia LED core order from a leading Chinese epi-ready wafer maker

Leveraging Combined Strengths of CSI & GT

Crystal Systems (CSI)

- Deep technical expertise
- Proven material quality process technology
- Long and broad material customer relationships

+

GTAT

- Leader in crystallization equipment
- Strong Asian capabilities-Sales, Service, Support
- Strong equipment customer relationships

Leading commercial solution for large scale, high yielding sapphire production for LEDs

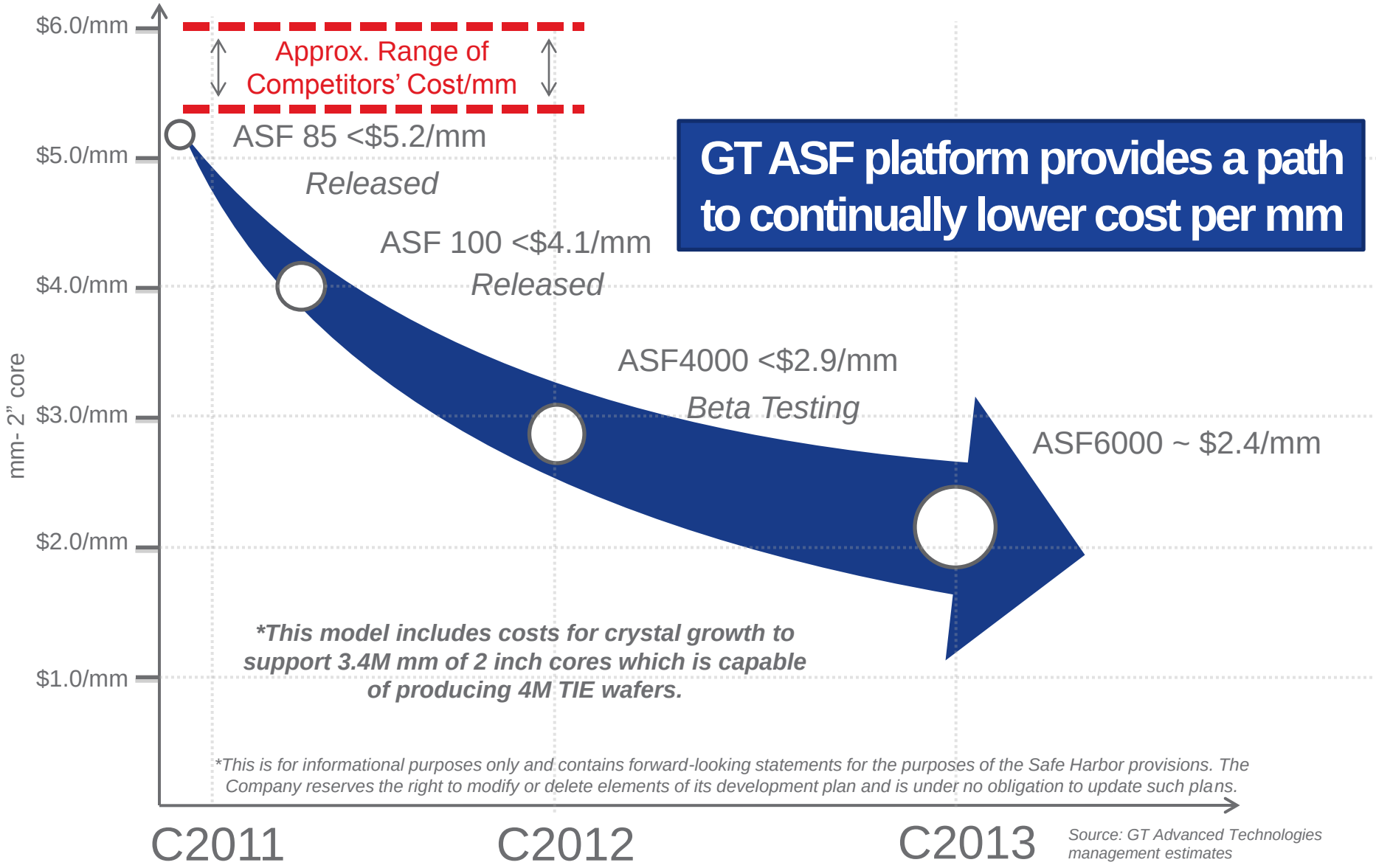
GT ASF™ High System Throughput

- Simple In-Situ seeding
  - Enables quick transition to growth increasing throughput
- A-axis is 2-3x faster then C-axis growth
- Scalable charge size gives higher per run output

GT ASF™ Productivity Advantage

- Bottom-up growth ensures quality crystal:
  - Allows gas to escape
- Stationary Growth Process
  - No moving parts
- Boule shape favorable to high core productivity

GT ASF™ COO Roadmap



GT Advanced Technologies ASF™, The Solution

GT's ASF Meets the CoO Challenge and Delivers on the Market Opportunity

ASF Equipment: Simple Path to Scalable Sapphire Platform Based on GT Experience in its Salem Operation

- Highly productive
- Consistently produces LED quality material
- Roadmap to scalability….6", 8" and beyond
- Reduced risk based on proven technology

CSI Acquisition: 40+ Years of Sapphire Material Production

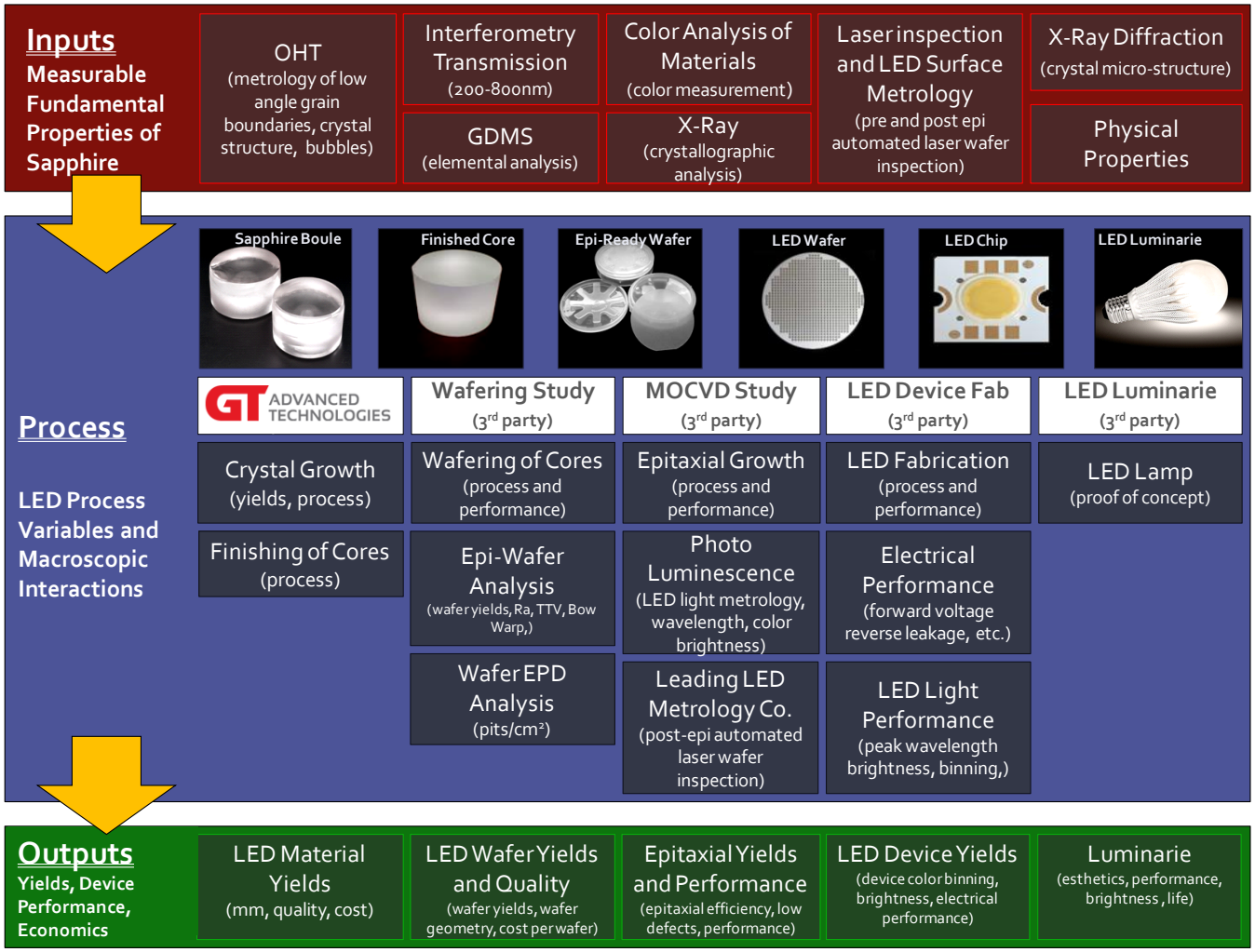
- Experience
- Know-how
- Results
- Captive, scaled, R&D investment
- Tier 1 customer list

GT Advanced Technologies Global Capability

- Demonstrated scale to volume
- Commercialize product for reliable output
- Established service and customer support

GT Material Characterization Study: Impact of Sapphire Material on LED Wafering

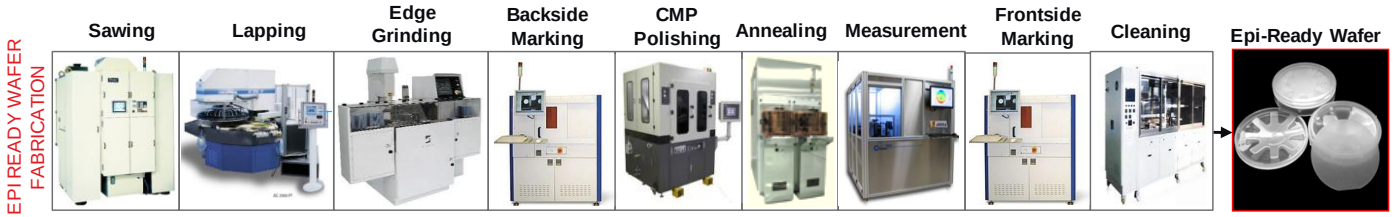
Design Of Experiment: Material Characterization Study



- Extensive sapphire material characterization project focusing on the entire LED manufacturing value chain
- Blind studies by **independent** laboratories and **3rd party** reputable manufacturers
- Wafering study is one phase of the ongoing characterization project

LED Wafering Study Overview

- Evaluated impact of sapphire quality on epi-wafer sapphire substrate manufacturing
- Analyzed sapphire material from GT **and** 3 other suppliers
- Material graded according to OHT & EPD
- Cores sent to an independent, reputable wafering house
- Data collected on key wafering parameters that drive yield and cost

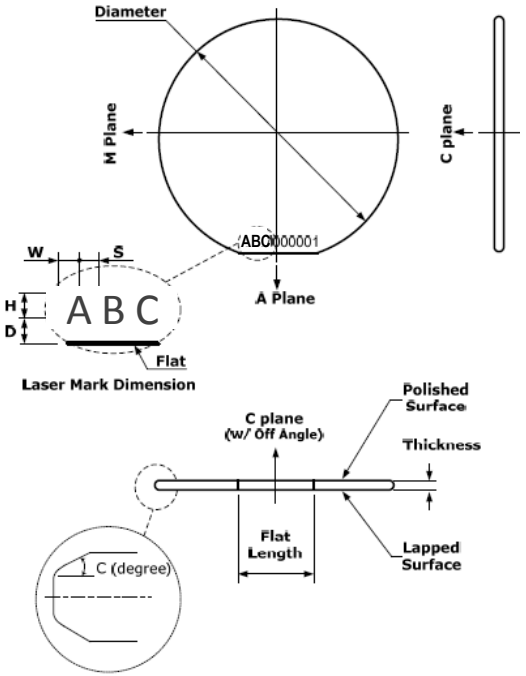


Epi-Ready Wafer Manufacturing Process

Material Specs

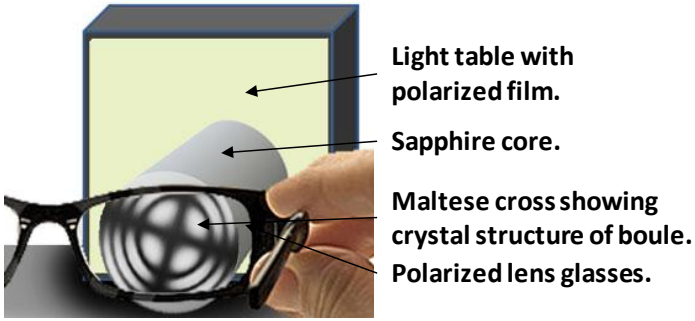
- 2-inch process
- 25 core samples totaling approximately 1,500mm of material (GT ASF™, KY1, HEM-like KY2)
- Wafer Specs:

Item	Specification
Material	High Purity and Monocrystalline Al_2O_3
Diameter	50.8 ± 0.25 mm
Thickness	430 ± 20 um
Orientation	C-plane (0001) off angle 0.20° ± 0.1°(M-axis); 0± 0.1°(A-axis)
Orientation Flat	16.0 ± 1.0 mm
Primary Flat Location	A-axis [11-20] ± 0.3°
Front Side Surface	Epi-Ready Polished
Surface Roughness	Ra < 0.3 nm
Edge Chamfering	Ground with 45 degree Chamfering
Back Side Surface	Fine Ground Ra = 1.0 ± 0.2 um
TTV	< 10 um
Bow/Warp	+3 ~ -10 um / < 10 um
Package	Clean Room, Nitrogen Atmosphere



OHT (Optical Homogeneity Technique)

Polarized Light Inspection



High Intensity Light Inspection

- Cores were graded using OHT, GT's method for grading sapphire quality
- OHT detects bubbles and crystal lattice defects at the boule and core level -- **before** the start of any downstream manufacturing
- Polarized light detects such defects as low angle grain boundaries (lineages), twins, and lattice distortions
- High intensity light provides a very accurate reflection of gas or bubble content in the core material

OHT Grading Results

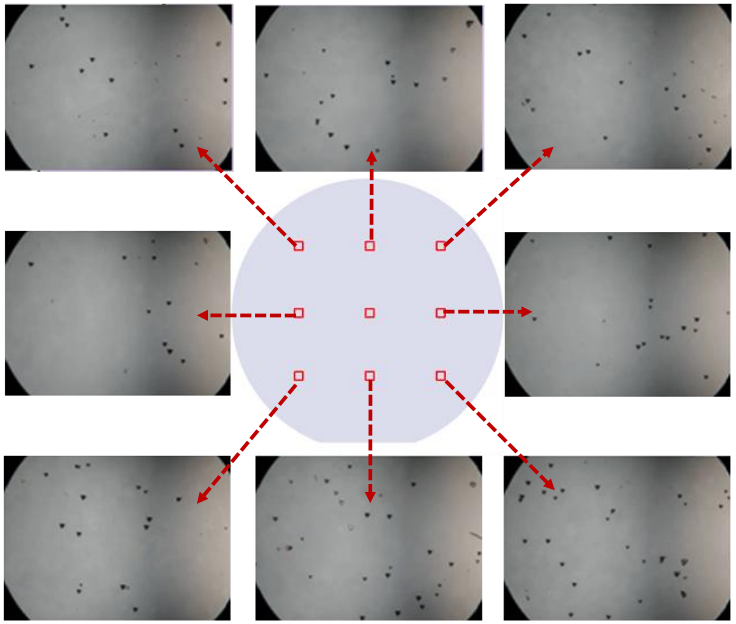
- Anonymously unmarked cores inspected and graded by GT's trained and experienced technicians
- LED or non-LED grade assigned

Supplier	Growth Method	Grade Marked by Supplier	OHT Grading Results
GTCS	ASF	LED	LED
GTCS		LED	LED
GTCS		LED	LED
GTCS		LED	LED
GTCS		LED	LED
GTCS		LED	LED
GTCS		LED	LED
GTCS		Not LED	Not LED
GTCS		Not LED	Not LED
GTCS		Not LED	Not LED
GTCS		Not LED	Not LED
GTCS		LED	LED
GTCS		Not LED	Not LED
Competitor 1	KY	LED	LED
Competitor 1		LED	LED
Competitor 1		LED	Not LED
Competitor 1		LED	Not LED
Competitor 1		LED	LED
Competitor 1		LED	LED
Competitor 2	HEM - Like	LED	LED
Competitor 2		LED	LED
Competitor 2		LED	LED
Competitor 3	KY	LED	LED
Competitor 3		LED	LED
Competitor 3		LED	Not LED

Note: ratio of LED to non-LED grade for ASF™ material is not typical of ongoing GT ASF LED quality yields but was purposely selected to assure an effective methodology for understanding the impact of crystal defects on LED manufacturing yields.

EPD Grading

- 2 wafer samples from each core were submitted for EPD analysis
- Each wafer was measured in nine locations as shown here
- GT avg. EPD count of 443pits/cm^2 (calculated on GT samples that were graded by OHT at or above “LED Grade”)



Supplier	Growth Technology	Lost Wafer Ratio
GT	ASF™	**2.4%**
Competitor 1	KY	6.0%
Competitor 2	HEM-like	6.9%
Competitor 3	KY	3.0%

EPD vs. OHT

- Study showed that EPD can fail to detect certain critical defects
- Some correlation between OHT and EPD however there were several critical data outliers
- Samples with passing EPD counts were graded as Non-LED by OHT (shown to have critical defects e.g. sharp low angle grain boundaries that impact LED manufacturing, wafer loss)

Core Sample	EPD (pits/cm2)				EPD Grading (<1000pits/cm^2)	OHT Grading Results	Missed Quality Problem by EPD
	Average	Std Dev	Max. Avg	Min. Avg			
1	246	105	347	145	LED	LED	
2	285	165	559	411	LED	LED	
3	264	185	307	222	LED	LED	
4	652	411	822	482	LED	LED	
5	662	346	664	660	LED	LED	
6	721	207	950	492	LED	LED	
7	271	177	381	361	LED	LED	
8	802	572	839	765	LED	Not LED	Missed
9	846	734	943	748	LED	Not LED	Missed
10	3568	3218	3898	3238	Not LED	Not LED	
11	627	316	842	411	LED	Not LED	Missed
12	670	188	738	603	LED	LED	
13	655	265	772	535	LED	Not LED	Missed
14	140	2006	148	131	LED	LED	
15	1358	68	1550	1166	Not LED	LED	
16	513	169	553	472	LED	Not LED	Missed
17	2551	1287	3417	1685	Not LED	Not LED	
18	111	77	142	81	LED	LED	
19	364	204	377	350	LED	LED	
20	332	151	381	283	LED	LED	
21	293	85	303	283	LED	LED	
22	268	120	270	260	LED	LED	
23	630	172	637	623	LED	LED	
24	522	212	549	495	LED	LED	
25	898	455	1193	603	LED	Not LED	Missed

LED Wafering Results

Wafering Results

Supplier	Growth Technology	After Anneal				Overall Rank
		Average Ra	Average TTV	Average Warp	Average Bow	
GT	**ASF™**	1.15	6.37	3.93	-0.76	**1**
Competitor 1	**KY**	1.21	6.16	4.29	-1.12	3
Competitor 2	**HEM-like**	1.21	8.60	6.08	1.28	4
Competitor 3	**KY**	1.20	7.87	3.56	-1.06	2

Rejected Wafer Ratio

Supplier	Growth Technology	Rejected Wafer Ratio	Overall Rank
GT	ASF™	**2.4%**	**1**
Competitor 1	KY	6.0%	3
Competitor 2	HEM-like	6.9%	4
Competitor 3	KY	3.0%	2

- 25 core samples, blindly marked, processed by independent wafer house
- Wafering results measured by evaluating wafer geometry data (surface roughness or Ra, total thickness variation or TTV, warp and bow) as well as the “rejected wafer ratio”
- Results show a difference based on growth methods
- GT has highest overall wafer geometry rank and highest wafer yield

Study Summary

- There are statistically significant and quantifiable differences between sapphire materials from different growth technologies
- Wafer yields matter; GT ASF™ material ranked #1 for wafer yields
- GT ranks best on overall performance based on Rejected Wafer Ratio, EPD results and wafering geometry
- OHT method detects critical defects in sapphire material that can be overlooked by EPD

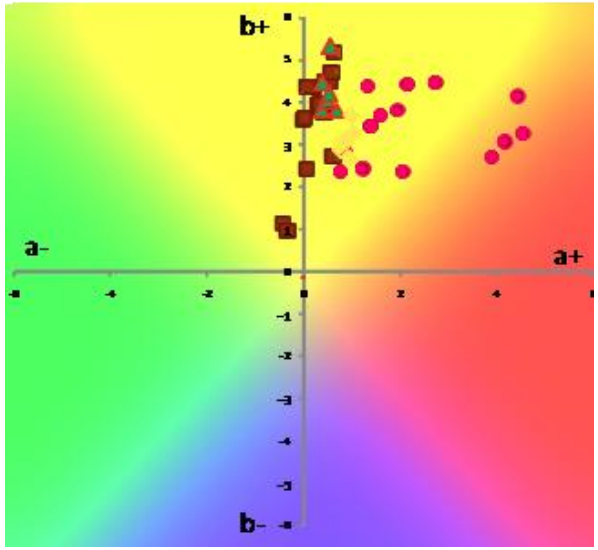
Wafering Analysis Ranking Results								
Supplier	Growth Technology	EPD Average Count	Wafering Performance				Wafer Yields *	Ranking
			Average Ra	Average TTV	Average Warp	Average Bow		
GTAT	ASF	2	1	2	2	1	1	1
Competitor 1	KY	4	3	1	3	3	3	3
Competitor 2	HEM-like	1	4	4	4	4	4	4
Competitor 3	KY	3	2	3	1	2	2	2

Additional Sapphire Material Characterization

Sapphire Material Analysis: Color

- GT has performed extensive studies on material color and color properties
- ALL sapphire material has color
- Competitors' materials were measured to more yellow hue whereas GT material had pink hue
- Yellow color under typical industrial lighting conditions is less noticeable than red
- Pink color in ASF™ sapphire is a result of an engineered growth process that reduces stresses during crystal growth; not an indication of impurities or contamination

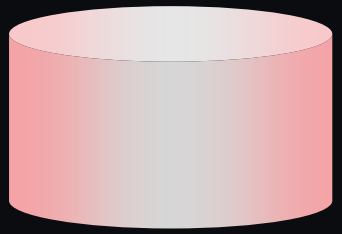
Color Measurement System

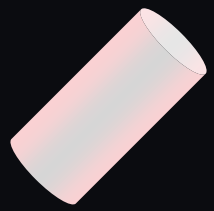


Competitor and GT Samples

Color is Not a Relevant Measure of Sapphire Quality

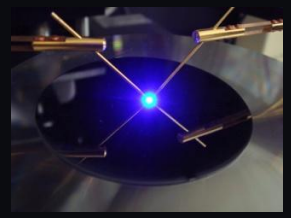
ASF™ Growth → Coring → Wafers (pre-anneal) → Epi- Ready Wafers (post-anneal) → LED Device Manufacturing





Slight pink at core and boule.
(<5 hunter color scale)

Pink undetectable by human eye at wafer level.
(~0 hunter color scale)

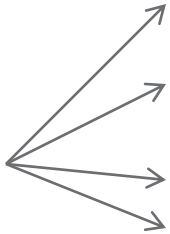


No color.
Light transmission at theoretical maximum.

- Any measurable color is gone at the wafer level pre-anneal
- Standard Epi manufacturing process calls for post-annealing at wafer level for **any and all** sapphire because stress induced by wafering process - this further eliminates any traces of color
- Pink color in sapphire cores (not wafer) does not impact any LED operational parameters
- As GT has ramped LED shipments, GT has had zero returns from LED customers because of pink

ASF™ Crystal Purity Exceeds LED Wafer Specifications

- ASF grown material is specified to be 99.995% pure, when used with commercially available feed stock
- GDMS analysis of five sample of material had an average purity of 99.9979% or <21PPM
- ASF crystal growth has very low concentrations of V, Cr, Mo, Fe, Ti, Mg, which are linked to color in sapphire
- ASF grown sapphire exceeds purity levels by epi-ready wafer manufacturers

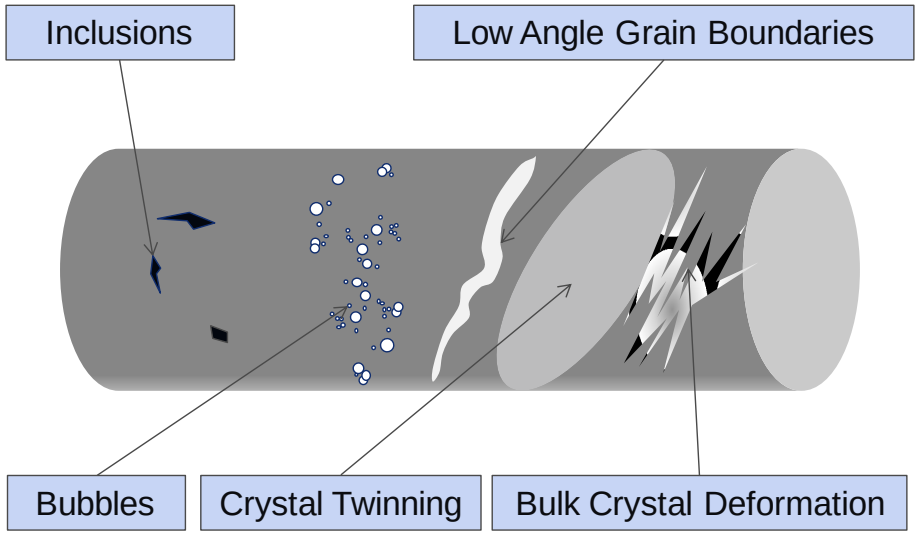


GDMS Analysis	
Element	PPM
O	Major
Al	Major
Si	5.91
Cl	3.10
Ca	2.20
Na	1.69
Zn	1.43
Fe	1.27
S	1.11
Cr	0.83
K	0.56
Ti	0.56
Mg	0.46
Cu	0.43
B	0.38
P	0.25
Ni	0.22
Mn	0.13
V	0.12

* other elements too low to be detectable levels by GDMS

Sapphire Core Metrics that Do Matter

The below diagram indicates potential defects in bulk sapphire core that matter…

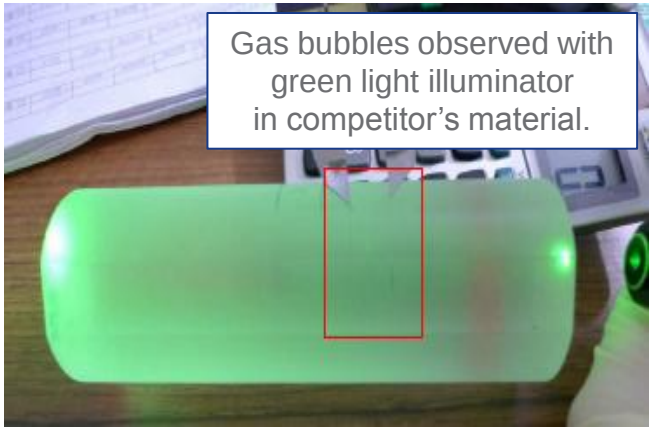


Defect	Impact
Bubbles	High (epitaxial growth, wafering yields)
Low Angle Grain Boundary	High (epitaxial growth, wafering yields)
Inclusions	Moderate (epitaxial growth, wafering yields)
Crystal Twinning	Moderate (epitaxial growth, wafering yields)

Customers consistently report that GT produces very high quality crystal:

- GT ASF™ growth process dramatically minimizes bubbles
- Proprietary OHT method detects the metrics that matter

Bubble Exclusion Zones in Competitive Material



- Competitors deliver cores with up to 30% exclusion zones due to heavy gas bubbles in the core.
- Exclusions increase LED device costs, affecting manufacturing and administrative processes.
  - loss of efficiency in wire sawing (managing zones)
  - rejections in MOCVD
  - logistics and administration of reject samples

GT **does not** ship material with exclusion zones

GT ADVANCED TECHNOLOGIES

Thank You

Forward-Looking Statements

This presentation contains information about management's future expectations, plans and prospects of our business that constitute forward-looking statements for purposes of the safe harbor provisions under The Private Securities Litigation Reform Act of 1995. Such statements are identified by words or phrases such as "will," "anticipate," "estimate," "expect," "project," "believe," "target," "guidance," "forecast," and other words and terms of similar meaning. In particular, forward-looking statements include, but are not limited to Company offering a leading commercial solution for large scale, large area sapphire production for LEDs, ability of the Company's Advanced Sapphire Furnace (ASF™) equipment customers to leverage Company expertise and track record in LED, ASF is engineered for high yields in LED manufacturing, Company's ability to deliver continued cost reductions for the LED industry, anticipated LED demand for the years 2011 through 2015 (as measured by mm2" cores), the expected growth in the LED industry and the factors driving such growth, the Company's ability to grow large boules of high quality, the delivery of high system throughput of the ASF, the expected cost of ownership for the ASF in 2011 through 2013 and beyond (and the cost per/mm using the ASF85, ASF100 and future planned ASF releases such as the ASF4000 and ASF6000), the anticipated ability of the ASF to provide a path to continually lower cost per mm (and the calculations supporting such statement), the timing and performance metrics for future ASF equipment releases, the number of ASF units to be shipped by the end of FY12, proven ability to ramp sapphire production, ASF customers remain committed and making progress on facilities, substantial opportunity for additional ASF furnace sales remains, anticipated production capacity of ASF85 order backlog by 2013, ASF offers simple path to scalable sapphire platform, ASF will consistently produce LED quality material, expectation that ASF provides a roadmap to scalability and reduces risk based on proven technology. These statements are based on management's current expectations or beliefs. These forward-looking statements are not a guarantee of performance and are subject to a number of uncertainties and other factors, many of which are outside the Company's control, which could cause actual events to differ materially from those expressed or implied by the statements. These factors may include the possibility that the Company is unable to execute on its sapphire equipment strategy or is unable to recognize revenue on contracts in its order backlog. Although the Company's backlog is based on signed purchase orders or other written contractual commitments in effect as of the applicable measurement time for such backlog, we cannot guarantee that our bookings or order backlog will result in actual revenue in the originally anticipated period or at all, which could reduce our revenue, profitability and liquidity. Other factors that may cause actual events to differ materially from those expressed or implied by our forward-looking statements include the possibility that changes in government incentives may reduce demand for solar products, which would, in turn, reduce demand for our equipment, technological changes could render existing products or technologies obsolete, growth of competition in all business segments, the Company may be unable to protect its intellectual property rights, competition from other manufacturers may increase, exchange rate fluctuations and conditions in the credit markets and economy may reduce demand for the Company's products and various other risks as outlined in GT Advanced Technologies Inc.'s filings with the Securities and Exchange Commission, including the statements under the heading "Risk Factors" in the Company's quarterly report on Form 10-Q for the fiscal quarter ended July 2, 2011. Statements in this presentation should be evaluated in light of these important factors. GT Advanced Technologies Inc. is under no obligation to, and expressly disclaims any such obligation to, update or alter its forward-looking statements, whether as a result of new information, future events, or otherwise.