Diamtec GmbH, Germany – the European office of IIa Technologies, Singapore
History

- **IIa Year of establishment in Singapore: 2005**
  Technical: IIa Technologies – www.2aTechnologies.com
  Gems and Jewelry Industry: GEMESIS – www.gemesis.com
  Microwave Plasma CVD technology for Poly Crystalline and Single Crystal Diamond
- The Group owns ALL the technology chain from start to end
- **IIa Technologies, Singapore**
  2012: Asian headquarter
- **Microwave Enterprises LTD**
  2013: American headquarter in Morrisville, NC
- **Diamtec GmbH**
  2014: European headquarter in Pforzheim, GER
People

IIa Technologies, Singapore

- Research: Prof. D.S. Misra
- R&D manager: Dr. Alvarado Tarun
- Application engineer: Lin Lin
- Senior Business Development Manager: Peter Sim

Diamtec GmbH, Germany

- Business Development / Sales: Detlef Hüffer
- R&D / Blue Ocean Strategy: Dr. Juergen Schöchlin

Microwave Enterprises LTD, NC

- Business Development: Dick Garard
- Sales: Keith Harris
Technology

IIa Technologies runs a fully integrated technology chain

- Seeds for CVD diamond growth **HPHT Technology**
- **X-ray Crystallographic Technology** for instant and accurate crystal orientation within 3 (1) degrees accuracy
- **Microwave Plasma reactors** for maximum efficiency
- **Laser cutting** and diamond **polishing facilities**

One of the world’s largest facilities for both HPHT and CVD diamond growth

- Size of up to 7mm x 7mm (**9mm square soon**)
- Thickness up to 4mm
- **<100>** growth direction
- **<100>, <110>** and **<111>** top/bottom oriented plates

Diamtec GmbH, Germany – the European office of IIa Technologies, Singapore
Product Characterization / Quality Control

**M grade**
- Microscopic inspection
- Crystal orientation (X-Ray Laue camera < 3°, better on request)
- Birefringence / internal stress
- Fluorescence – if required (UV or RAMAN @ 514nm)

**O grade** (additionally)
- Optical transmission
- transparency
- N concentration < 1ppm

**E grade** (additionally)
- substitutional N concentration < 5 ppb
- Surface polishing, surface quality – roughness/damages
- purity, uniformity
- Time stability - max electric field - leakage current
Product Characterization E grade

Dimensions and thickness
Upto 7mm×5mm×1.5 mm (+/-0.1 mm)

Surface Roughness (Ra)
< 2.5nm (both sides polished)

[N] (single substitutional)
< 1 ppb

Charge Collection Distance

@ E = 0.2V/mm (Alpha and Beta)
Full collection

Charge Collection Efficiency
@ E = 0.2V/mm
100 %

Carrier Lifetime (ns)
e = 21.4 +/- 5.5 ns h = 25.65 +/- 1.3 ns

Drift Mobility and velocity
@ 300 K (cm²/s)
e = 2000 +/-100  h = 2600 +/-30

Thermal Conductivity @ 300K
>2200 Wm⁻¹K⁻¹

Transmission @ 10.6um (FTIR)
> 71 %

Rocking curve width
< 40 microRadian
Products under development

**I grade**
- C12 isotopic sc CVD diamond
- under development
- Requirements / Comments?

**C grade**
- Boron doped sc CVD diamond - about $10^{16}$
- still under development
- Available next year
- Requirements / Comments?
Sales terms

- Availability: on stock – on request
- Delivery times: 2-8 weeks
- Prices: competitive, volume based
- Distribution within Europe: Ger-Pforzheim
- Payment: 10 days net
Diamtec GmbH, Germany – the European office of IIa Technologies, Singapore
Thank you very much for your attention

Please get in contact with us for detailed information:

**Diamtec GmbH**
Am Irma Feldweg Str. 8
75179 Pforzheim
Germany
Phone: +49 (0) 7231 15540-210

- dh@diamtec.com
- js@diamtec.com