Trinity College Dublin

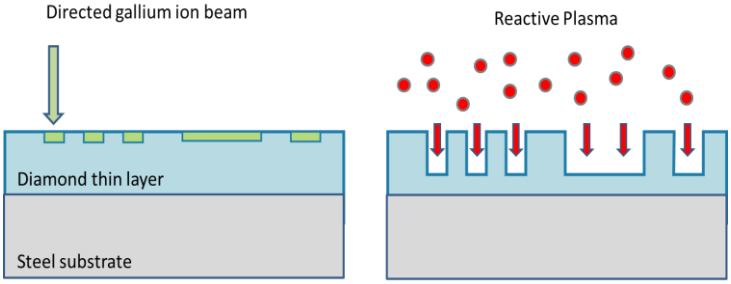
Flexible Diamond Patterning Technology

Available for license

Basic overview

Diamond is the hardest known material. It is biocompatible, chemically inert, and is an intrinsic wide bandgap semiconductor. These properties make diamond an ideal material for a wide range of nano and micro-scale applications.

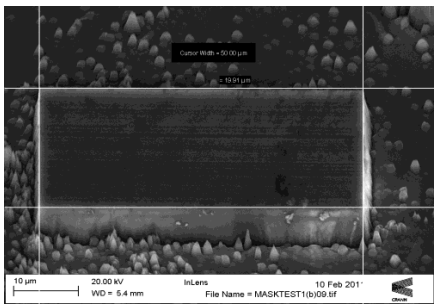
Diamond patterning technology developed in CRANN, Trinity College Dublin, enables **high resolution nano-scale engraving on to the surface of diamond**. This facilitates a wide range of applications specific to diamond in a simple cost-efficient method for the first time.



Diamond patterning process

Advantages

- High resolution patterning - nano-scale
- Improved die lifetime due to diamond hardness and low friction
- Cost efficient patterning method
- High resolution - 14 nm high aspect ratio (5:1)
- Up to 8 microns of feature depth into diamond
- High throughput- low dose, e-beam comparable, can cover large areas
- Substrate geometry can be irregular or non-planar
- Simple, two-step process that is resistless with grey scaling
- Wide range of diamond material- Single crystal, NCD, UNCD, DLC



Simple Box structure (50 x 20 x 8μm)

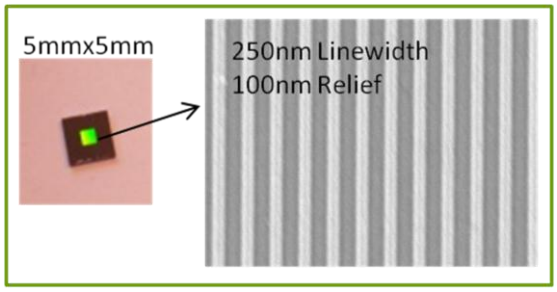
Applications

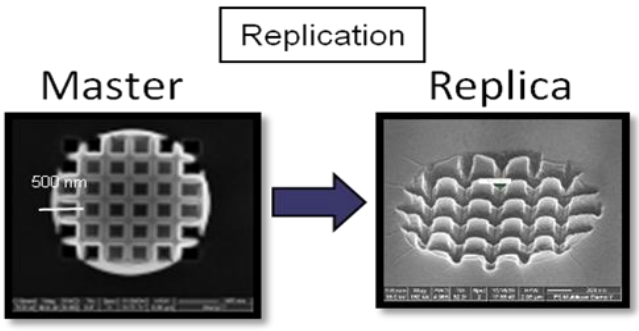
Industry sectors for application of this technology are wide ranging and include:

- MEMS
- Semi-conductors
- Hard disk manufacturing
- LED/photonics
- Clean energy
- Medical applications
- Anti-counterfeiting

Technology and patent status

Patent applications have been nationalised in the US, Europe and Australia in 2011.





Optical features and replication in diamond layer

The opportunity

Opportunities exist to create a spin-out or licence this technology.

Interested has already been registered in from a number of companies in relation to nanoimprinting of metals.

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www.crann.tcd.ie/Industry-Commercialisation/Available-Technologies.aspx

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