



Australian National Fabrication Facility

Providing micro and nano fabrication facilities for Australia's researchers

ANFF Diamond CVD & Nanoparticle Facilities - Macquarie University

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FLAGSHIP EQUIPMENT

- ◆ Seki microwave Chemical Vapour Deposition (CVD) system
- ◆ JEOL Field Emission Scanning Electron Microscope (FESEM)
- ◆ Kleindiek Manipulator System
- ◆ Planetary Ball Mill

KEY CAPABILITIES

- ◆ Materials which can be produced include:
 - ◆ Continuous polycrystalline diamond film on various substrates
 - ◆ Monocrystalline diamond microparticles
 - ◆ Ball-milled nanoparticles
- ◆ High magnification FESEM imaging of nanomaterials

Diamond has many novel properties that enable a diverse range of applications. These include biocompatibility, high thermal conductivity, low coefficient of thermal expansion, high Raman gain, and controllable fluorescence.

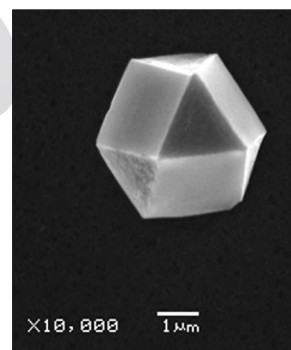
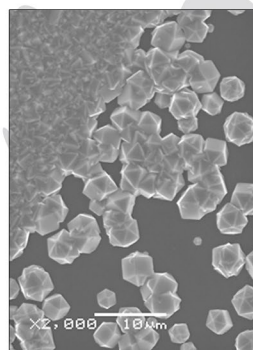
At the Diamond CVD & Nanoparticle Facilities at Macquarie University we grow diamond from a hydrocarbon gas mixture using the Chemical Vapour Deposition (CVD) method. Our expert specialists can manufacture single crystal diamond microparticles or continuous polydiamond films over large areas and on various substrates. The properties of synthetic diamond depend on fabrication processes; by fine tuning our seeding methods and growth recipes, we have the ability to grow diamond with specific characteristics. Our CVD diamond has been used for tool coatings, thermal management and in emerging optical applications of nanocrystalline diamond.



Within our Facility we also house a Field Emission Scanning Electron Microscope (FESEM) to investigate micro and nano surface structures. Our FESEM (JEOL JSM-7100F) provides topographical information at magnifications as high as 1,000,000X.



In order to allow in-situ physical handling, assembly and characterisation of samples at the microscale, our FESEM has been fitted with Kleindiek manipulator probes and grippers.



To further supplement our Facility, a bench top planetary ball mill is used for grinding sample material down to very small sizes. The interplay between frictional and impact forces within our ball mill can effectively reduce material sizes to the nanometre scale.

Contact

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