MANCHESTER 1824
The University of Manchester

WET CHEMISTRY CAPABILITY

Overview
In our cleanrooms, many aspects of graphene and 2D materials research are made possible by processes borrowed from thin-film or semiconductor processing. Many of these processes are well established, having been developed and fine-tuned over many decades of research and industrial activities. Others need to be adapted to the specific requirements of 2D materials research.

In particular, the term “wet chemistry” encompasses a large variety of processes based on liquid chemicals commonly used in semiconductor processing: from substrate cleaning and preparation to etching structures and dissolving resists for metal lift-off.

These processes are performed at a controlled temperature in a clean environment, in either purpose-built fume hoods or wet benches using high purity solvents, acids and alkalis.

Capability profile
The NGI cleanroom has a large wet chemistry area, making it possible for the research of graphene and other 2D materials to incorporate a selection of methodologies. These techniques enable device fabrication to include such things as metal etches, anisotropic silicon etches, and chemical cleaning. These processes can be combined as needed during device fabrication to enable greater freedom of research.

Our range of core processes have been created or adapted by our technical team in order to streamline device fabrication; they are already developed and risk assessed in order to allow researchers to continue with their work.

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Methodologies, COSHH assessments and risk assessments are made available to researchers to review prior to commencing work using our online portal to ensure that work is carried out safely.

When research requires a method that is not included in our core processes, our technical team will work together with researchers to create a new process for their use or adapt existing methods for use in our cleanroom facility.

Such processes are carried out in specific fume hoods or wet benches to ensure health and safety while limiting cross contamination with other processes.

Core processes available:

- Aluminium etching
- Chromium etching
- Copper etching
- Gold etching
- Nickel etching
- Silicon and silicon oxide etching
- Acid piranha cleaning
- RCA-1 and RCA-2 cleaning
- Solvent cleaning including metal lift-off