

MOORFIELD NANOETCH SOFT ETCHING SYSTEM



To achieve the largest 2D flakes through mechanical exfoliation onto a solid substrate such as SiO₂, the surface of the substrate must be totally free of organic contaminants, this will maximise the strength of the interaction between the flakes and the substrates. Low power plasma etching can be used as a final step in the cleaning of Si/SiO₂ substrates before deposition of 2D flakes to promote adhesion, removing residual organic contaminants left over from chemical cleaning; it can also be used for the surface cleaning of other, more exotic substrates such as PDMS; finally it can be used for the highly controlled etching of graphene mono- and multi-layers.

The Ar plasma is primarily involved with physical etching of samples, the high energy Ar nuclei collide with surface molecules and break their bonds to the surface and to a lesser extent some of the internal molecular bonds; the O₂, while still being able to physically etch, is mostly concerned with the oxidisation of longer chain organic molecules into smaller, more volatile species and the conversion of carbon into carbon monoxide.

The Nanoetchers have the capability to create RF plasma (up to 30 W) of a user defined mix of Ar and O₂. The Nanoetchers have either a 3" or a 6" sample stage to allow the etching of multiple small samples simultaneously or larger full-wafer samples. The most common uses at the NGI are substrate cleaning and graphene etching applications.

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| Base Pressure | 5x10 ⁻⁷ mbar |
| Power Supply | 30 W with 1 W resolution |
| Sample Stage Size | 3", 6" diameter |
| Process Gas Flow Rates | 1 – 50 sccm |
| User Defined Recipes | 30 |
| Fast Vent Module | 3 minute vent time |
| Touchscreen Graphical User Interface | |
| Auto Matching Unit | |
| Active (Upstream) Pressure Control | |