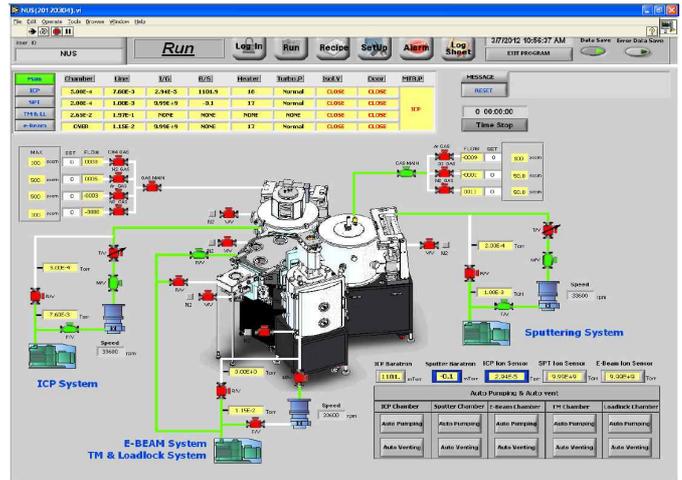


# ATS-CVD Series PECVD-PVD Cluster System for Graphene Synthesis



## Special Features

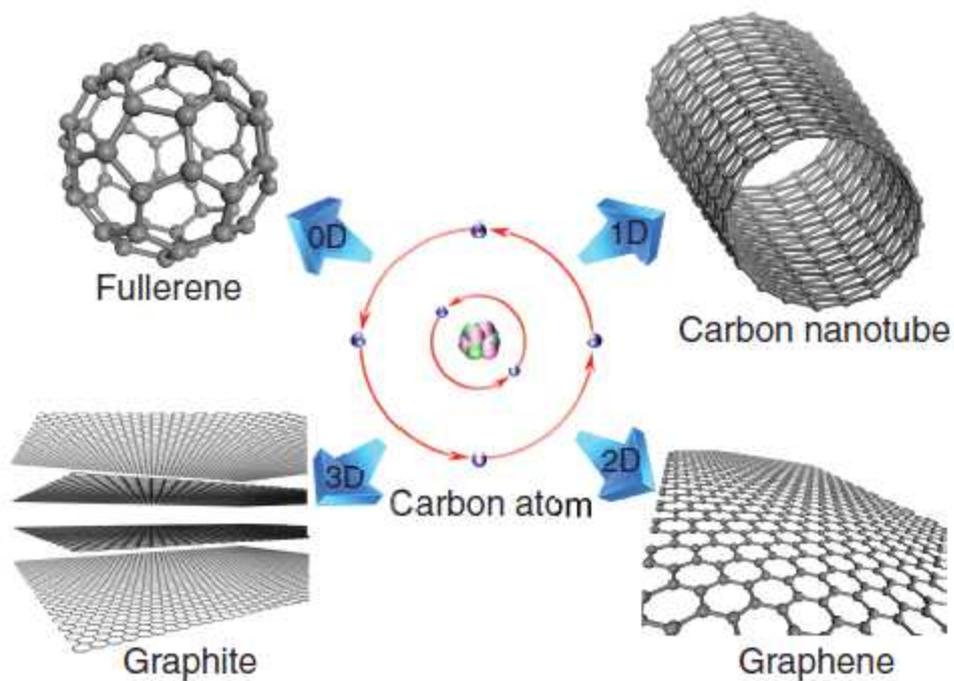
- ◆ Multi-functional cluster system combined with PECVD, sputter and E-beam evaporation for high quality graphene synthesis
- ◆ Maximum substrate heater temperature: 1,000 °C for PECVD, 800 °C for Sputter and 500 °C for e-beam evaporation, respectively
- ◆ Automatic loading transfer chamber around which PECVD, Sputter and E-beam evaporation chambers are attached
- ◆ PC controlled system : recipe save, open function, and fully automation except for e-beam evaporation module
- ◆ Wafer capacity: 8" x1
- ◆ Average throughput: 2,000 wafer/year

## Specifications

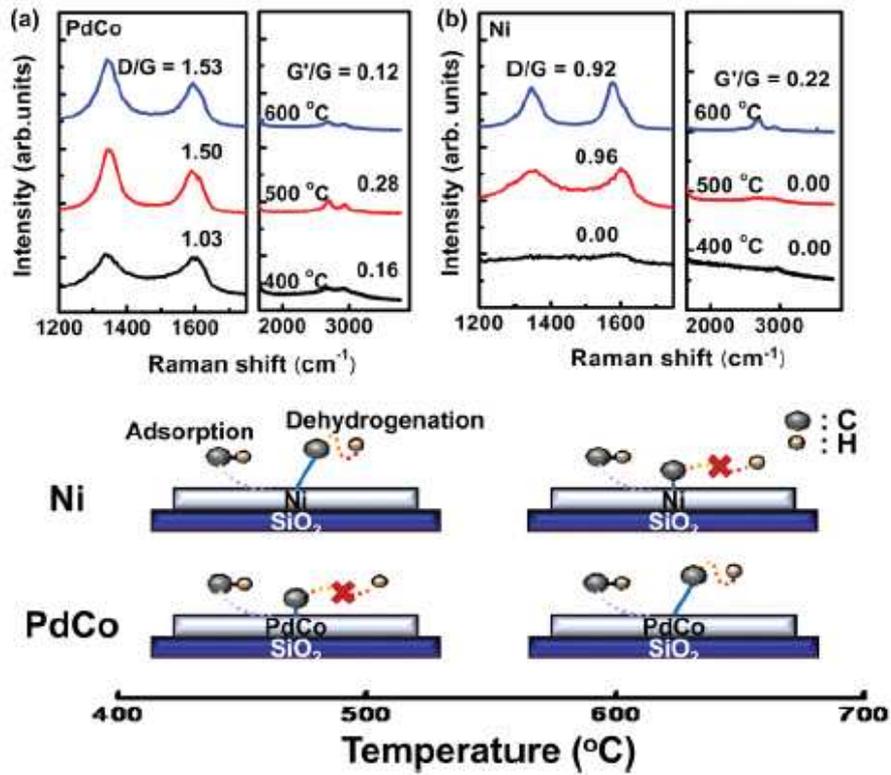
PECVD	
Item	Specifications
Source power	2.5kW (13.56MHz)
Bias power	0.3kW (12.56MHz)
TMP	1,100ℓ/sec
Dry pump	9,000ℓ/min
Substrate heater	SiC coated graphite, Max.1,000 °C
RF ICP coil	2turns
MFC	CH4(50sccm), H2(200sccm), Ar(200sccm)
Pressure control	Automatic pressure control system

Sputter	
Item	Specifications
Sputter power	1.5kW (DC)
Bias power	0.3kW (13.56MHz)
TMP	1,100ℓ/sec
Dry pump	9,000ℓ/min
Substrate heater	SiC coated graphite, Max.800°C
MFC	Ar(100sccm), O2(50sccm), N2(50sccm)
Pressure control	Automatic pressure control system

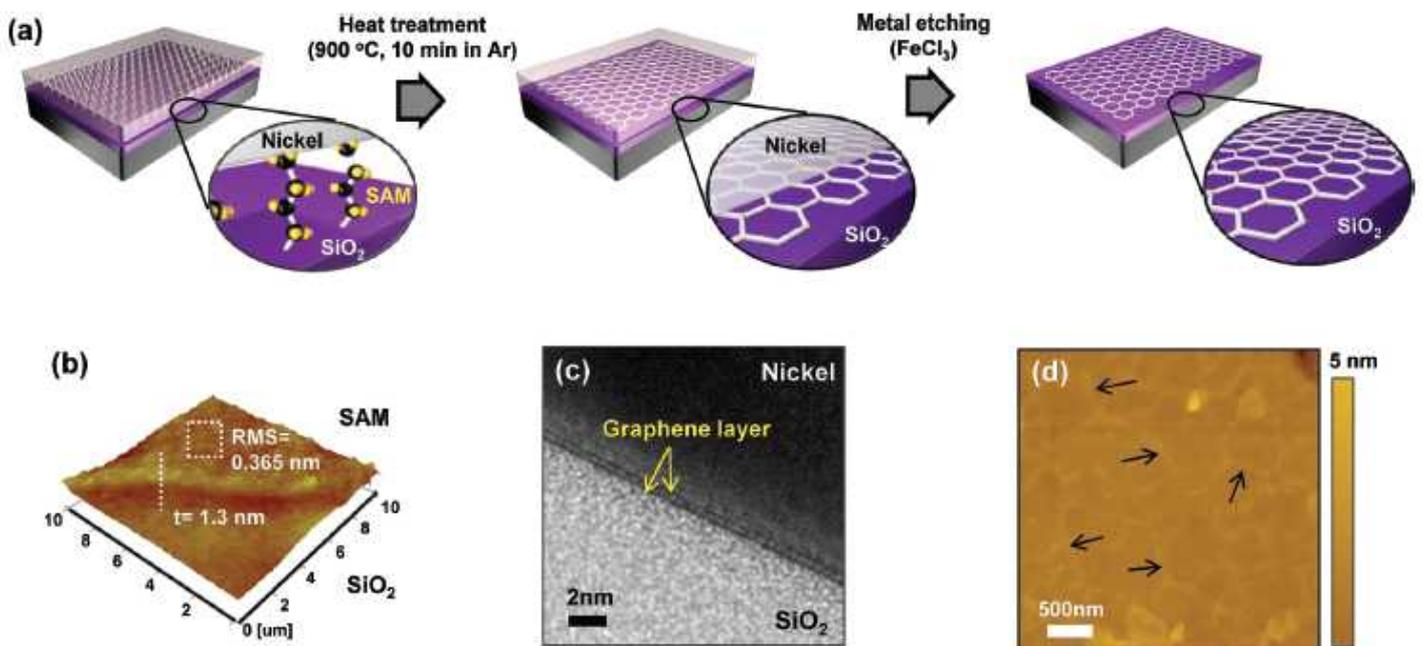
E-beam evaporation	
Item	Specifications
E-beam power	10kW(10kV, 1A)
E-beam gun	4 pocket, 25cc, 180°
TMP	1,100ℓ/sec
Dry pump	9,000ℓ/min
Substrate heater	SiC coated graphite, Max.500°C
Thickness monitor	SQC310



Crystal structures of different carbon allotropes

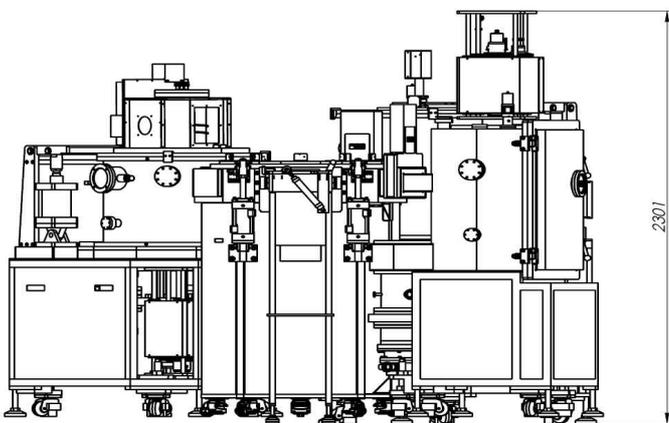
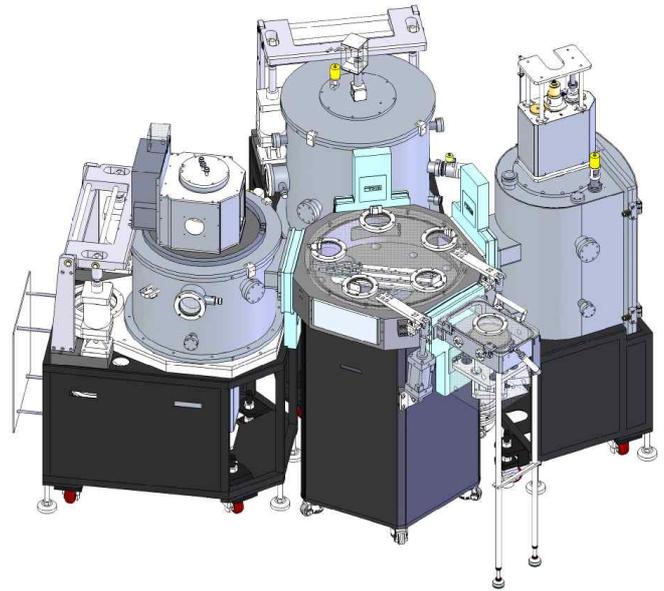
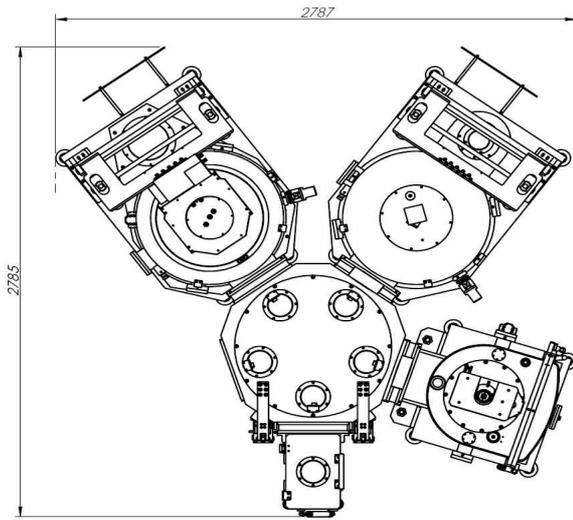


Raman spectra of synthesized graphene film on 100nm PdCo film and 300 nm Ni film on SiO<sub>2</sub> substrate at different temperatures



Schematic illustration for transfer-free growth of graphene on a substrate

Layout



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