



Compact ALD-CVD system

1-inch substrate

2 ALD sources

2 CVD precursors

Benefits

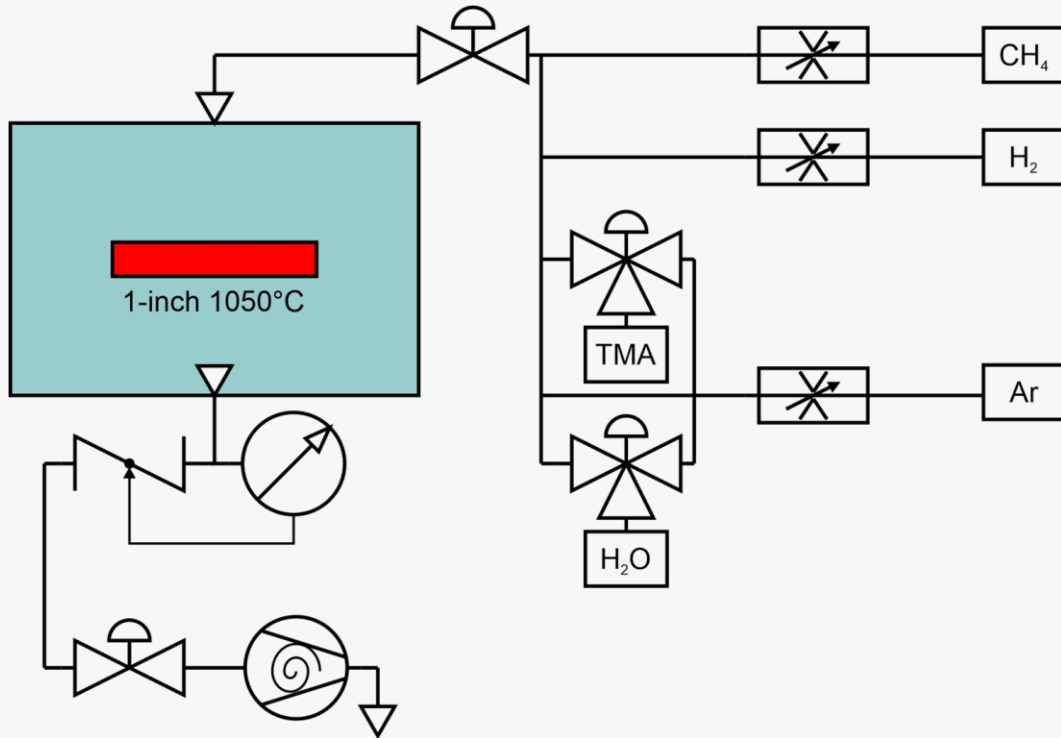
Direct conformal growth of thin film metal oxides on low dimensional carbon nanomaterials without breaking vacuum. Example: ALD Al₂O₃ on CVD graphene or carbon nanotubes.¹

- 2 CVD gasses² e.g., H₂ and CH₄
- 2 ALD sources² e.g., TMA and H₂O
- 1 common carrier gas² e.g., Ar
- 1-inch substrate heater, max T 1050°C
- Independent control of process dosage, mass flow rate, pressure, and temperature
- Precursor flow is normal to substrate's surface: gas inlet at the top with gas exhaust at the bottom
- Easy loading/unloading via top door
- Computer controlled process parameters: ALD pulses, gas flow rates, chamber pressure, substrate temperature, and gas lines temperature

¹ Ref: Aria et al., ACS Appl. Mater. Interfaces 2016, 8, 44, 30564–30575

² Gasses and sources are not included

Main features



- CVD MFCs – 100 sccm for H_2 + 200 sccm for CH_4
- ALD sources – 2 pneumatic 3-port valves heated to 120°C
- Heating jackets for ALD sources and gas lines up to 250°C
- Carrier gas MFC – 1000sccm for Ar
- 1-inch W heater with graphite housing with quartz susceptor and max T 1050°C
- 2000 W temperature controller with K-type thermocouple
- 1000 torr gas independent capacitance manometer
- Pneumatic exhaust shut off valve for ALD dosage and resident time control
- Motorised exhaust throttle valve for CVD pressure control
- 250 L/min dry scroll pump
- Stainless steel 304 cold wall reactor (300OD x 200H) with view port (50OD) and top loading door