

# Graphene and Carbon Nanotubes



Carbon materials have shown great promise in micro-fabrication due to their incredible physical and electrical properties. DTU Danchip offers the state of the art equipment for deposition of this element - the AIXTRON "Black Magic" tool, as well as supporting tools for seed layer deposition, carbon transfer, lithography and plasma etching.

Graphene, a single layer of carbon atoms, is among the most promising new carbon materials, with electron mobility more than 25 times higher than silicon, and mechanical strength 200 times higher than steel. This makes it an ideal candidate for transparent electronics, as advanced membrane material and as a unique platform for advanced sensors. At Danchip's sister facility, the center for electron nanoscopy (DTU CEN) two FEI Titan, 300 kV transmission electron microscopes (TEM) can be brought to use for detailed atomic scale analysis of graphene.

Our AIXTRON - Black Magic Chemical Vapour Deposition (CVD) system can handle substrates ranging from single chips up to 4". The system can run processes up to 1100°C with high speed ramping up to 5 K/s and active cooling for faster processing. A multitude of carbon materials can be deposited in the Black Magic system. These range from single- and multi-walled carbon nanotubes (SWT, MWT), amorphous carbon films (aC, aC:H), diamond-like films (DLC) to single layer graphene.

To access our carbon processing equipment, contact us for further information at [sales@danchip.dtu.dk](mailto:sales@danchip.dtu.dk).



## Gasses on the Black Magic CVD

Acetylene  $C_2H_2$

Methane  $CH_4$

Ammonia  $NH_3$

Argon Ar

Hydrogen  $H_2$

Nitrogen  $N_2$