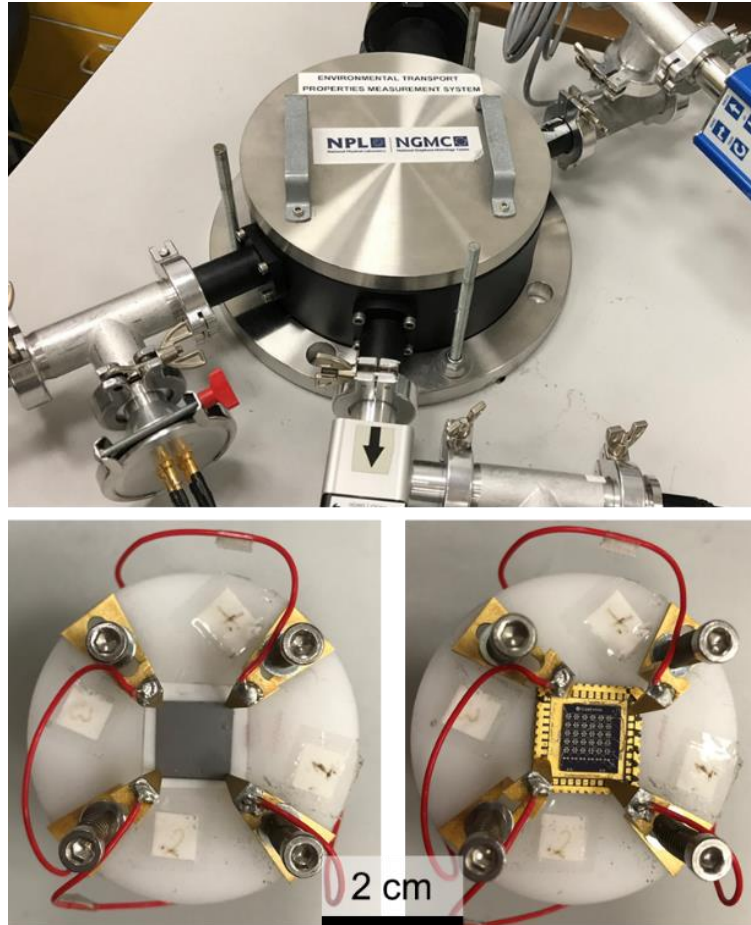


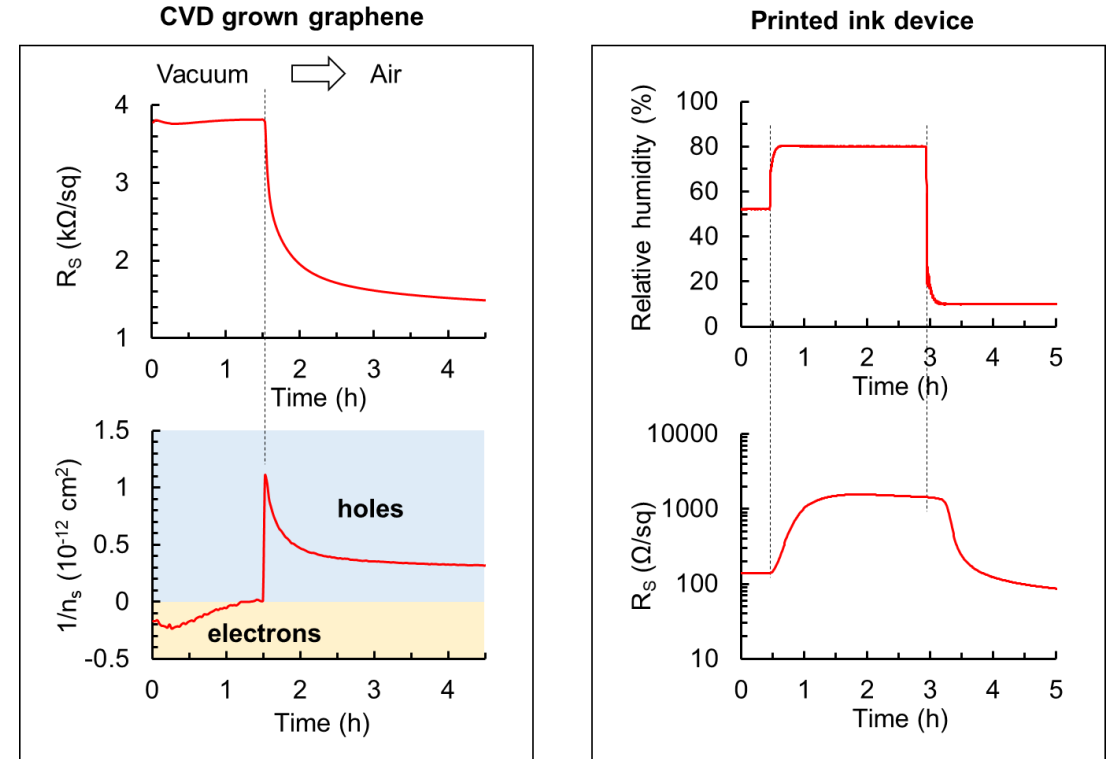
Electrical Transport Measurements in Variable Environments Setup (ETMiVE)

Outline

- The custom-built setup is capable of electrical transport measurements in the following conditions:
 - Ambient
 - Vacuum (down to 10^{-5} mbar pressure)
 - Controlled relative humidity (0 to 80%)
 - Controlled gas environment
 - Temperature ranging from 300 K to 400 K
 - Magnetic field range of ± 25 mT
 - AC electrical excitation (up to 100 kHz)
- The electrical transport measurements are automated and can be performed continuously in a fixed or varying environment. Further customisation is possible upon request, e.g., 2-wire device measurements, DC excitation, mixed gas environments.



Measurement chamber (top). Sample holder probing a continuous conductive film (bottom – left) and a microscale device on a chip (bottom – right). The electrical contacts of the microscale device are extended to a chip carrier via wire bonding.



Representative results from a CVD grown graphene film on SiO₂ (left) and a water-based conductive ink printed on a glass substrate (right). The environment changes from vacuum to air for the graphene sample (left). The response in the electrical properties is very clear: the sheet resistance drops and the majority carrier type switches from electrons to holes. For the printed ink device, the relative humidity is varied between 80% and 10% (right). Orders of magnitude change in the sheet resistance is captured as a result.

Further Details

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