Large area CVD Graphene TEM supports

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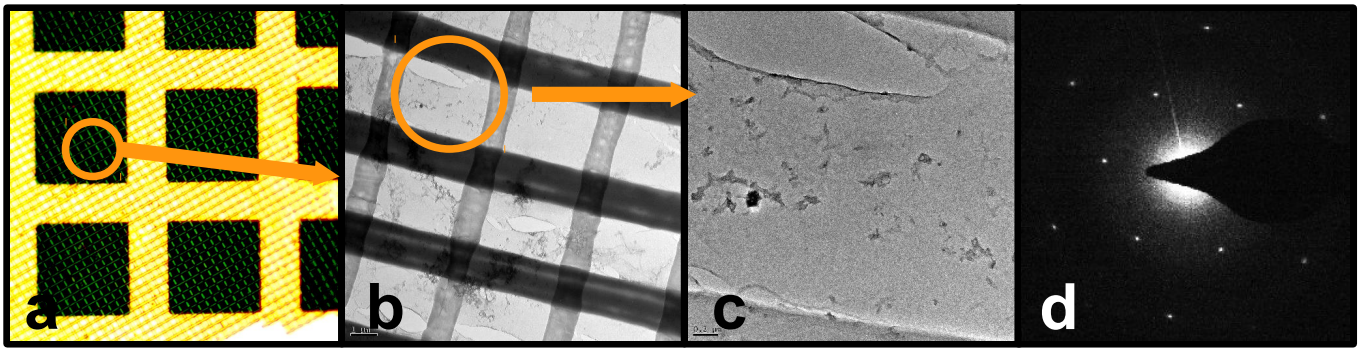
We present a process for fabricating large area TEM support using CVD graphene grown on copper foils. The thinness of graphene and low atomic number of carbon facilitates imaging of nanoparticles and biomaterials. The TEM supports are composed of graphene held sandwiched between two sets of perpendicular exposed and annealed photoresist lines, whose dimensions can be varied as needed. Unlike other methods, graphene is strongly adhered to this mesh structure, providing it mechanical stability. The mesh is mechanically strong enough to be handled by tweezers. We display large area structures covering whole TEM grids (3 mm). Further, the whole structure is carbonaceous and therefore, can undergo harsh chemical treatments and is biocompatible. The characterisation of graphene available on these samples was done using STEM, TEM and Raman spectroscopy, showing good quality monolayer graphene. Small amount of organic contaminants, leftover from fabrication, can be cleaned using a process developed in our group. Finally, we use these grids for imaging nanoparticles and show their advantages compared to normal TEM grids.

Figures:



a) Optical image of copper TEM grid covered with carbon mesh. b) STEM of carbon mesh made of photoresist lines and graphene. c) TEM image and d) ED pattern of graphene in mesh. The width of photoresist lines in (b) is about 1 µm.