In this poster, we demonstrate that a graphene membrane is ultimate support for transmission electron microscopy. The low atomic number of carbon and inert nature of graphene surface can provide single-adatom sensitivity for TEM imaging and can help to reveal dynamics of complex chemical reactions of adsorbates. Using graphene membrane and UHV-TEM for future studies may provide insights for nano-science and nano-technology.

Graphene TEM sample preparation

CVD graphene on Cu → Spin on and cure PMMA → FeNO3 etch → DI rinse → Pull graphene on PMMA out of DI onto grid → Lift off PMMA in acetone → Well-adhered graphene grid

Identification of single layer graphene

Graphene on TEM grid → Raman spectrum & TEM image of graphene

Illustration of UHV-TEM

Evaporator of Ag atoms → A Suspended Graphene → TEM Cu Grid → TEM Lower Polepiece → TEM Upper Polepiece → TEM Electron Beam → Screen

Individual Ag atoms on graphene

The white arrows indicate Single Ag adatoms

Graphene flakes to spheroidal structure

The transformation after 20mins 200kv e'beam radation.

Dynamics of Ag adatoms along a Ag nanoparticle in a labeled region on Graphene

5 Ag adatoms → 6 Ag adatoms → 7 Ag adatoms → 8 Ag adatoms