Self-Assembled Air-Stable Supramolecular Porous Networks on Graphene

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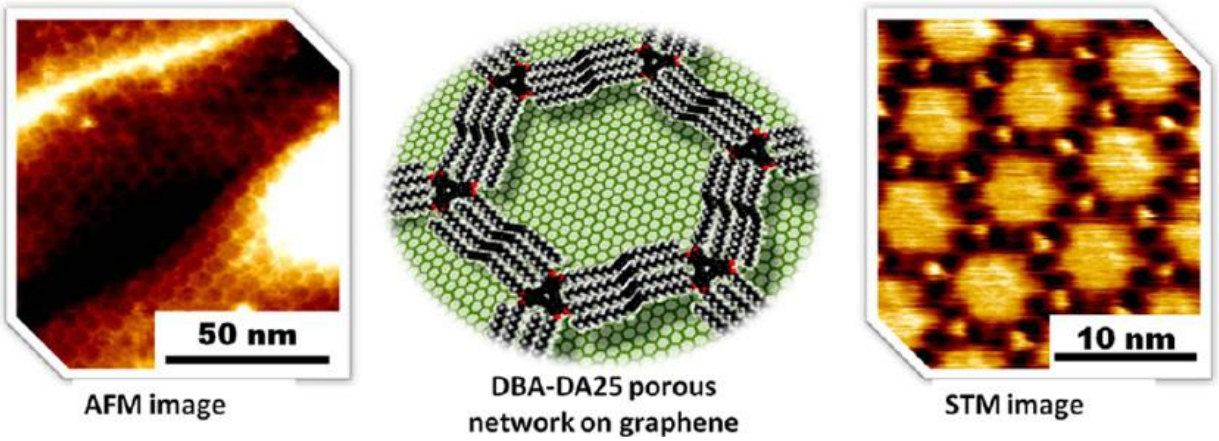
Functionalization and modification of graphene at thenanometer scale is desirable for many applications. Supramolecular assembly offers an attractive approach in this regard, as many organic molecules form well-defined patterns on surfaces such as graphite via physisorption. Here we show that ordered porous supramolecular networks with different pore sizes can be readily fabricated on different graphene substrates via self-assembly of dehydrobenzo[12]annulene (DBA) derivatives at the interface between graphene and an organic liquid. Molecular resolution scanning tunneling microscopy (STM) and atomic force microscopy (AFM) investigations reveal that the extended honeycomb networks are highly flexible and that they follow the topological features of the graphene surfacewithout any discontinuity, irrespective of the step-edges present in the substrate underneath. We also demonstrate the stability of these networks under liquid aswell as ambient air conditions. The robust yet flexible DBA network adsorbed on graphene surface is a unique platform for further functionalization and modification of graphene. Identical network formation irrespective of the substrate supporting the graphene layer and the level of surface roughness illustrates the versatility of these building blocks.[1]

References

[1] B.Li, K. Tahara, J. Adisoejoso, W. Vanderlinden, K.S. Mali, S. De Gendt, Y. Tobe, S. De Feyter, ACS Nano, 7, (2013) 10764



Self Assembly of DBA-DA25 on E-G/SiC graphene under ambient conditions.