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# Towards the atomic-scale characterization of isolated iron sites confined in a nitrogen-doped graphene matrix

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## Highlights

- Local atomic and electronic structure of the Fe-N-C catalyst characterized by STM and STS.
- The combination of air-AFM, UHV-STM and DFT calculations for the characterization of powder catalysts.
- The selection of solvent is vital to the homogeneous dispersion of powder catalyst on a planar support.

## Abstract

Atomic scale characterization of the surface structure of powder catalysts is essential to the identification of active sites, but remains a major challenge in catalysis research. We described here a procedure that combines atomic force microscopy (AFM), operated in air, and scanning tunneling microscopy (STM), operated in UHV, to obtain the atomic structure and local electronic properties of powder catalysts. The atomically dispersed Fe-N-C catalyst was used as an example, which was synthesized by low temperature ball milling methods. We discussed the effect of solvents in the dispersion

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