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Real – time Observations of Metal Nanoparticle Etching in Ultraclean Suspended Graphene.

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We describe a range of experimental conditions under which we observe unprecedented long–term stability in suspended graphene membranes under intense electron beam irradiation in environmental TEM. The stability and lack of beam–induced contamination permits us to study in real–time the dynamics of high–temperature catalytic etching of graphene sheets by metal nanoparticles. We observe rich particle dynamics with several distinct modes of graphene etching, and consider in which way this may lead to crystallographic nanolithography on a large scale.

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