

# Discrete removal of carbon atoms by silver nanoparticles in suspended graphene

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In order to realise a number of future applications of graphene, new lithographic technologies capable of patterning graphene down to the few-atom scale are needed. It is critical that these new techniques maintain the desirable proerties of graphene - i.e. high mobility, lack of contamination from resists and applicability to suspended graphene, whilst remaining capable of patterning features down to the few nanometer scale with sub-nanometer edge roughness.

The oxidative channeling behaviour of silver nanoparticles in suspended graphene is a process which can provide these benefits, and in addition produce channels exactly aligned with the  $\langle 100 \rangle$  (zigzag) direction in monlayer suspended graphene. In-situ TEM provides unparalleled insight into this process [1], and highlights some hitherto unforeseen challenges in the patterning of graphene on the few-atom scale.

[1] Booth, T.J. et al. Nano Letters 11, 2689-2692 (2011).