

Abstract Submitted
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Metal-catalyzed etching of graphene GUANGJUN CHENG, IRENE CALIZO, ANGELA HIGHT WALKER, PML, NIST — We present a comparative investigation on the etching of graphene catalyzed by Fe and Cu. With combined evidence from scanning electron microscopy and Raman spectroscopy, we demonstrate that the strikingly different etching behaviors between Fe and Cu are governed by their distinct interactions with carbon. Due to the strong Fe-C interactions, graphene is severely damaged through not only catalytic carbon hydrogenation but also carbon dissolution into Fe alone. In contrast, due to the weak Cu-C interactions and non-wetting behavior of Cu on graphene, Cu particles etch channels in graphene through carbon hydrogenation and the width of the channel width is much narrower than the diameter of catalytic particle. This work provides unprecedented insights into the metal-catalyzed carbon hydrogenation.

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