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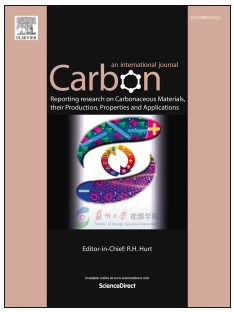

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An Etching Phenomenon Exhibited by Chemical Vapor Deposited Graphene on a Copper Pocket

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ABSTRACT: What causes graphene etching is still controversial. Here we report a special etching phenomenon on the outer surface of a copper (Cu) pocket, while large-size graphene domains grow slowly on the inner surface. A systematic study along a time axis was conducted to investigate this etching process through isotope-tracing. When millimeter-size graphene domains on the inner surface joined together, the original monolayer graphene with a few residual multilayers stayed behind on the outer surface, indicating that multilayer graphene formed in the interim subsequently disappeared. Combined with our previous work, we conclude that the etching phenomenon is analogous to a counter diffusion process that keeps a stable monolayer of graphene on both sides of the Cu foil. Low C solubility and poor C saturation in Cu appear to drive this counter diffusion and help keep the stable state. Furthermore, we used a