

Copper Oxidation through Nucleation Sites of Chemical Vapor Deposited Graphene - DTU Orbit (09/11/2017)

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We investigate the nucleation defect-triggered oxidation of Cu covered by CVD graphene during postannealing in air. The results reveal that different growth conditions may induce imperfect nucleation of graphene, and cause creation of defects near the nucleation point such as pin holes and amorphous carbon. These defects would serve as a pathway for the diffusion of O_2 during thermal annealing, allowing oxidation of Cu to progress gradually from the nucleation center toward the growth edge. The oxidation process follows the graphene morphology closely; the shape of the oxidized area of Cu has a striking resemblance to that of the graphene flakes. Our work demonstrates that inferior graphene nucleation in CVD processes can compromise the oxidation resistance of a graphene-coated Cu substrate, and indirectly reveal the structure and integrity of graphene, which is of fundamental importance for the quality monitoring and control of graphene growth, for understanding the mechanisms of graphene nucleation and growth, and has implications for graphene's use in electronic and passivation applications.

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