

Continuous temporal imaging of graphene growth by isotope labelling

Eric Whiteway, Wayne Yang, Victor Yu, Michael Hilke

Department of Physics, McGill University, Montréal, Canada H3A 2T8
whiteway@physics.mcgill.ca

We developed a method to visualize the continuous growth of graphene by chemical vapour deposition using controlled ratios of ^{12}C and ^{13}C methane. This technique was used to extract growth rates of the graphene crystals along arbitrary paths and compare rates for single and multi layer graphene, as well as to understand the nucleation time of different crystals. We examined the dependence of the graphene growth rate on the locally available copper surface and extracted the diffusion length for the adsorbed carbon species. We compared samples produced under different low pressure CVD conditions and examine the effect of methane and hydrogen rates on the dendricity and growth rates of graphene crystals. Our technique allows us to draw a physical picture of the growth dynamics of graphene and could be used for other CVD grown materials.

