Characterization of Friction Anisotropy on Exfoliated Monolayer Graphene

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Graphene is a very attractive object because it possesses a number of unusual properties which are often unique or superior to those in other materials in our planet. The mechanical exfoliation method, typically used to transfer graphene flakes to a substrate, is thought to be a facile technique to obtain a single crystalline graphene. The mechanically exfoliated graphene, however, has not been able to provide an ideal graphene with performance comparable to that predicted by theory. This is because the structural and/or electronic defects have been considered as one cause of reduced performance. Recently, it has been experimentally measured friction anisotropy-driven domain on a monolayer graphene mechanically exfoliated on silica substrates, and proposed that the domains arise from ripple distortions that give rise to anisotropic friction in each domain as a result of the anisotropic puckering of the graphene. However, fundamental understanding of the anisotropic puckering of the graphene still remains to be elucidated. Here, we have reported a precise measurement of change and stabilization in friction anisotropy-driven domain with recursive imaging.