

Electricity Generation from Water Droplet Infiltration in Graphene Oxide Film

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Generating electricity by using a monolayer graphene sheet through the interaction with water has been recently observed, but there still remains a challenge in terms of lowering the cost with a more stable material as well as defining the underlying mechanism. In this study, we used a type of free standing reduced graphene oxide film fabricated by utilizing parafilm as a sacrificial substrate. The method involves drop casting of graphene oxide on a paraffin film and peeling off after swelling the film with toluene to obtain free standing, graphene oxide film. The voltage was generated by absorption of an ionic solution droplet over this reduced graphene oxide film and the ionic type, concentration, and pH were examined to elucidate the origin of electricity generation. With only a small amount of droplet water, we managed to generate electricity that lasts for a long time. Moreover, nitrogen-doped reduced graphene oxide film was fabricated via a facile hydrothermal approach with doping reaction at the interface of reduced graphene oxide and ammonia vapor. The inversion of surface charge is to be achieved and propose desired performance and application.