가장자리가 선택적으로 기능화된 그래핀 대량생산 및 에너지변환 촉매응용(Scalable Production of Edge-Selectively Functionalized Graphene Nanoplatelets as Efficient Energy Conversion Catalysts)

백종범*

UNIST 에너지화학공학부

(jbbaek@unist.ac.kr*)

The scalable production of heteroatom-doped graphene nanoplatelets (GnPs) is an important challenge for many applications in practice. Here, we demonstrate efficient and eco-friendly methods for the large-scale synthesis of low-cost and high-quality GnPs and their applications. The approach involves edge-selective functionalization of graphite as a precursor for GnPs via a "direct" covalent attachment of organic molecular wedges and/or functional groups to the edges of pristine graphite. It is an important step toward high-yield exfoliation of three-dimensional graphite into two-dimensional GnPs with minimal basal plane distortion. The resultant edge-selectively functionalized GnPs (EFGnPs) displayed outstanding electrocatalytic activity. Our findings suggest that the EFGnPs can be prepared and conveniently used as base materials for a wide range of applications from wet chemistry to device applications.