Atomically Thin Graphene Oxide Encapsulation of Mg Nanocrystals for Safe and High Density Hydrogen Storage

조은선†
KAIST
(escho@kaist.ac.kr†)

Graphene-based nanomaterials have attracted considerable research interest over the past decade due to their extraordinary electronic, mechanical and thermal characteristics, addressing global challenges in renewable energy and environmental issues. Such graphene materials are also increasingly employed in gas transport and separation because of their atomically thin and mechanically exceptional properties. Graphene oxide layers possess a hydrogen-selective penetration characteristic through their intrinsic defect sites. Hydrogen is an ultimate clean energy source, and it is crucial to develop a high-performance solid-state hydrogen storage material to realize hydrogen economy. Combining a hydrogen-selective characteristic of graphene oxide layers with an excellent storage capability of magnesium nanocrystals, a high-performance and safe hydrogen storage multilaminate was successfully exploited via a facile method, also presenting a remarkable air-stability.