

Fabrication and Characterization of VO_x/Graphene Electrode for Supercapacitor박용진^{1,2}, 이규복^{1,†}¹충남대학교 에너지과학기술대학원; ²한국기계연구원(kyubock.lee@cnu.ac.kr[†])

Although the graphene is regarded as a promising ideal material for the electrode of the supercapacitor, its electrochemical performance is still less enough to satisfy the current demand raised in real applications. Here, using a home laser engraver, firstly we performed the prompt and selective reduction of the graphene oxide to produce multilayered and highly porous graphene maintaining high electrical conductivity. Subsequently, the resulting graphene was conformally decorated with pseudocapacitive thin VO_x using atomic layer deposition in order to maximize electrochemical performance. We observed that various forms of VO_x exist in the VO_x/graphene hybrid. The hybrid was mechanically robust and showed highly improved specific capacitance (~189 F/g at 1 A/g) as compared to the graphene without VO_x (~46 F/g at 1 A/g). A coin-cell supercapacitor made with these VO_x/graphene hybrids functioned stably and exhibited high energy density as well as cyclic stability. We expect that our approach is accepted as one of the alternatives to produce the graphene-based electrode for various energy storage devices.