산화 그래핀의 열적 환원에 의한 에너지 저장 특성

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Graphene oxide (GO) has been attractive due to its possibility as an energy storage material. Herein, we show that the thermally reduced GO (TrGO) is a good candidate for rechargeable Li-ion batteries (LIBs) and hydrogen storage materials. TrGO was synthesized by a modified Hummers method followed by thermal reduction to remove its functional groups (hydroxyl, epoxy, and carboxyl groups) under a nitrogen atmosphere at variable temperatures (300, 400, 500, and 600 ºC). We have measured high pressure H_2 isotherms at 77 K and electrochemical properties as anode materials in LIBs for the four TrGOs. The maximum H_2 storage capacity of ~ 5.0 wt% and reversible charge-discharge capacity of 1220 mAh/g at 30 mA/g current density are achieved with TrGO annealed at 400 ºC. This behavior is interpreted by the measurement of surface area, pore size with N_2 isotherms at 77K. These results demonstrate that the existence of optimal pore size for hydrogen storage and electrochemical properties of LIBs.