

Study of Wrinkled Vertical MoS₂ for Hydrogen Evolution Reaction

정우빈, 정희태[†]

한국과학기술원

(heetae@kaist.ac.kr[†])

Hydrogen evolution reaction (HER) is a key point for clean energy technology. The best electrocatalyst for HER is platinum, but it is expensive and unsuitable for large-scale hydrogen production. Edge of MoS₂ has similar behavior with Pt in point of hydrogen adsorption and desorption. Vertical MoS₂ has much more edge sites than planar MoS₂, so it is one of the best materials for HER. But, it has still low performance compared to platinum due to low defect sites, low conductivity, and low surface area. We approached high performance HER through wrinkle generation on vertical MoS₂. Wrinkle is bottom-up patterning process, so it is very easy and simple method. We used polystyrene (PS) film as shrinkage film and transferred MoS₂ on PS film. After shrinking, we achieved vertical MoS₂ wrinkle with a few hundred nanometer scale. Wrinkle can induce higher surface area on MoS₂. In addition, strain from this wrinkle can affect to conductivity between electrode and MoS₂.