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## Synthesis and electrochemical analysis of molybdenum sulfide promoted by various metals for hydrogen evolution reaction

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In this study, electrocatalytic activity of metal promoted molybdenum sulfide (MoS<sub>2</sub>) for hydrogen evolution reaction (HER) was investigated. Molybdenum plate was calcined at 898 K, and sulfidized at 873 K under a flowing of hydrogen and hydrogen sulfide gas mixture (9:1). Various metals (Co, Ni, Mn and Fe) were electrodeposited on the surface of molybdenum disulfide under constant current. Surface morphology and composition were examined by scanning electron microscopy (SEM) and energy dispersive X-ray spectrometry (EDS), respectively. Physicochemical properties of the synthesized samples were investigated by X-ray diffraction (XRD), high resolution transmission electron microscopy (HR-TEM) and X-ray photoelectron spectroscopy (XPS). Cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) were carried out in alkaline solution to evaluate electrochemical properties of the sample with a voltage range from 0.125 V to -0.3 V vs. RHE at 20 mV/s of scan rate. All electrochemical characterizations were iR-compensated properly. Graphite foil and a Hg/HgO were used as the counter electrode and the reference electrode, respectively. Compared with pure molybdenum disulfide, metal doped catalysts showed enhanced catalytic activity and cycleability.

### Biography

Taewoo Kim has completed his bachelor's degree in 2014 and now been master degree candidate under Prof. Sung-Hyeon Baeck in Department of Chemistry and Chemical Engineering, Center for Design and Applications of Molecular Catalysts, Inha University from Korea.

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