

### Co-modified Ni foam by pulse electrodeposition as a structured catalyst for hydrolysis of sodium borohydride

이유진<sup>1</sup>, 민동수<sup>1,2</sup>, 서유나<sup>1,2</sup>, 김민규<sup>1,2</sup>, 조영석<sup>1</sup>, 정향수<sup>1</sup>, 손현태<sup>1</sup>, 윤창원<sup>1</sup>, 김광범<sup>3</sup>, 남석우<sup>1</sup>,  
김용민<sup>1,†</sup>

<sup>1</sup>한국과학기술연구원; <sup>2</sup>한양대학교; <sup>3</sup>연세대학교

Structured cobalt-nickel catalysts for sodium borohydride hydrolysis (SBH) were synthesized by surface modification of a nickel foam with aluminum followed by cobalt electrodeposition. Cobalt electrodeposition was performed via chronoamperometry in an optimal voltage condition ( $-2.0$  VAg/AgCl) to avoid a local cobalt dendritic deposition on the edge side of the substrate. Additionally, the pulsed electrodeposition technique with two voltage conditions where cobalt could be plated and dissolved was applied in an alternating manner to a porous nickel foam. The pulse technique was not only effective in reducing a cobalt particle size but also controlling the deposition amount of cobalt particles while maintaining improved catalytic performance by cobalt incorporation. As a consequence of the cobalt pulse electroplating, cobalt particles of about 147 nm were uniformly deposited on the porous nickel foam. The catalytic performance of the catalyst was increased by about 1.5 times compared to the porous nickel foam due to the effect of introducing cobalt particles even though deposited Co content is 0.57 wt.%.