Partially embedded CoO nanoparticles into N-doped carbon as highly durable and efficient bi-functional electrocatalyst for oxygen reduction and evolution reaction

김형훈[1,2], 김영민[1,2], 노유성[1,2], 김원배[1,2,†]
[1]광주과학기술원 신소재공학부;
[2]광주과학기술원 차세대에너지 연구소
(wbkim@gist.ac.kr†)

Based on a synergic mechanism, N doped carbon and cobalt oxide composites possess remarkable catalytic ability for oxygen electrochemical reaction. Despite outstanding the catalytic ability, low durability due to the detachment of cobalt oxide nanoparticles from N doped carbon during oxygen evolution reaction should be resolved. In this work, partially embedded CoO particles into N-doped carbon was synthesized by pyrolysis at in Ar atmosphere. The prepared material was analyzed by SEM, TEM, XRD, TGA and XPS. According to an electrochemical test of the catalyst, enhanced catalytic ability for oxygen reduction reaction and evolution reaction was observed and it retained more than 90% of the initial activity even if oxygen evolution reaction was conducted for 6000s continuously. [This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIP) (No. 2014R1A2A1A11052414) and the Core Technology Development Program for Next-generation Solar Cells of Research Institute for Solar and Sustainable Energies (RISE), GIST.]