

Tofu derived M-NPC catalyst for oxygen reduction reaction최규환¹, 임경민², 유성종³, 김진수^{1,2}, 박범준^{1,†}¹경희대학교; ²KHU-KIST; ³KIST(bjpark@khu.ac.kr[†])

A conventional electrocatalyst, which contains a noble metal with complex synthesis process, causes a high price of fuel cell. Such a high price is the major reason for hindering the daily supply of fuel cells. To reduce the production price of fuel cells, the development of simple fabrication process with mass-productivity and the replacement of the use of noble metals should be required. Transition metal catalysts with Metal-N-C (M-N-C) sites has been investigated as an alternative of the noble metal catalyst for the oxygen reduction reaction (ORR), which occurs on a cathode of fuel cell. In this research, to generate the M-N-C sites, protein precipitation is used through chelating metal cations with protein's functionalized groups, -COOH and -NH₂. For doing this, we utilize the traditional fabrication method of tofu made of soy milk to intake the proteins. To separate the dissolved protein from soy milk as a solid state, coagulant containing the metal divalent cations (i.e., Mg²⁺ and Ca²⁺) is added. Accordingly, the solidified protein contains the M-N-C site for ORR, in which the coagulant components (Mg²⁺, Ca²⁺) replace the transition metal components (e.g., Ni²⁺, Co²⁺).