A stable and cost-effective air electrode in fuel cells and metal-air batteries

엄성현*, 정범균, 신동윤, 이재영
광주과학기술원
(laminat@hanmail.net*)

The air electrode of fuel cells is one of the most expensive cell components and is largely responsible for governing the performance of the fuel cell. Metal-air batteries, also called metal fuel cells or air-depolarized batteries consist of a metal anode and an air cathode as well. While platinum is the most effective catalyst for polymer electrolyte fuel cells, its cost and availability limits commercial applications using current technology. Complete replacing platinum will require the development of platinum alternatives, which is very hard challenge to achieve. Therefore, the growth in demand for cost-effective non-noble air cathodes has increased activity in the development of novel ORR catalysts that are active and durable especially in alkaline electrolytes. In this study, we report on our approach, which are based on electrospinning and pyrolysis, to prepare non-noble carbon nanofiber (CNF) cathode catalysts to enhance the electrocatalytic activity for oxygen reduction reaction as well as ethanol tolerance in alkaline media. Furthermore, the electrochemical and morphological nature of the catalysts in conjunction with electronic state of surface region was characterized to elucidate the mechanistic origin.