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# The catalytic activity of cathode with sputtered cobalt with graphene oxide on carbon paper

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Many efforts have been focused on the development of high-energy-density power source to support the increasing demand of portable devices. Polymer Electrolyte Membrane Fuel Cells (PEMFC) is efficient and clean electrochemical power devices that have the potential for the applications in the energy conversion and storage. The PEMFC can be operated at a low temperature at about 80˚C and can be applied to the mobile electric source such as Laptop, Motor vehicles, etc. After the invention of fuel cell by Sir Grove in 1839, Pt-based catalysts were used as the most common electrode materials for the Oxygen-Reduction Reaction (ORR). However, its deficiency and high price drive to develop new non–precious metal catalysts which are potentially less expensive and more abundant. In the year 1964, Jasinski observed catalytic activity of cobalt phthalocyanine to the ORR. Many methods have been tried to create practical Non Precious Metal Catalysts (NPMCs). Many studies have shown that the reaction of the nitrogen atoms and non-precious transition metals into nano carbon materials can improve the electro-catalytic performance. Commonly, nitrogen-doped carbon materials can be fabricated by two methods: Directly doping during the synthesis of carbon materials and by post-treatment of the as-prepared carbon materials with nitrogen precursor. Especially, nitrogen and transition metal containing carbon composites fabricated via pyrolysis of precursors containing metal salts, nitrogen, and macrocyclic compounds have been demonstrated to be active in catalyzing ORR. Transition metals such as Co and Fe to improve the performance will require a robust method for increasing the reactivity of the metal ion through ligation. In this study, we sprayed graphene on Carbon Paper (CP) by spray method. A Cobalt (Co)-based electro catalyst was fabricated by sputter deposition on GO layered CP and then subjected to a heat treatment in an ammonia (NH3) environment. The fabricated Co/N/Go/CP was investigated as an electro-catalyst for ORR in PEMFC by Cyclic Voltammeter (CV) and Electrochemical Impedance Spectroscopy (EIS).

## Biography

Dong Min Kim has completed his PhD from University of Wisiconsin-Madison in the year 2004 and Post-doctoral studies from University of Wisconsin-Madison, Department of Materials Science and Engineering. He is a Professor at the Department of Materials Science and Engineering in Hongik University, Korea. He has published more than 50 papers in reputed journals and had studied in solar cells and fuel cell in renewable energy.

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