

### Adoption of nano-materials for the micro-layer in gas diffusion layers of PEMFCs

박구곤\*, 손영준, 임성대, 양태현, 윤영기, 이원용, 김창수  
한국에너지기술연구원  
(gugon@kier.re.kr\*)

Gas diffusion layers(GDLs) of a PEMFC consist of gas diffusion media and micro-layers. For micro-layers, carbon blacks, such as Vulcan XC 72, have been widely used. Main functions of GDLs are distribution of reactants to the active site of electrode, management of water supplied and/or generated and electrical contact between the electrode and the bipolar plates. Among various PEMFC operating conditions, such as temperature, pressure, humidity, fuel utilization, etc, degree of fuel humidity is one of the most critical factors which affect on the fuel cell performance. Humidity of fuels are also closely related on the water management in membrane electrode assembly(MEA) and GDLs. In the aspect of water management, design of gas diffusion media and micro-layers should be importantly considered. In this work, nano-fibers and nano-tubes are adopted to the micro-layer of GDLs. By applying nano-materials, thinner micro-layers can be fabricated. This newly made micro-layer showed higher gas permeability and better electric conductivity with similar degree of water management as well as enhanced performance.