Dukjoon Kim, Polym Sci, 3:3
DOI: 10.4172/2471-9935-C1-001

Dukjoon Kim

Sungkyunkwan University Suwon, Republic of Korea

Proton exchange membranes prepared from crosslinked and multi-block copolymers based on poly (arylene ether ketone)

Sulfonated poly(arylene ether ketone)s (SPAEKs) are for application of fuel cell electrolyte membranes. The chemical structure of the polymers synthesized is identified using 1H - and 19F- nuclear magnetic resonance spectroscopy, attenuated total reflection fourier transform infrared spectroscopy. Sulfonated mesoporous benzene-silica (SMBS) hygroscopic conductors are embedded in the membranes to lessen their dehydration in the low humid environment. The effects of sulfonation degree (SD) and hygroscopic conductors on the membranes properties are analyzed. The prepared SPAEK membranes are thermally stable up to 250°C without any chemical degradation. While the SPAEK membranes containing hygroscopic proton conductors exhibit superior conductivity to that of Nafion®117, those showed lower methanol permeability. Although the water uptake of the composite membranes is higher than that of the pristine membranes, no mechanical failure is observed. In the synthesis of SPAEK, the development of distinguished hydrophobic-hydrophilic phase separation is confirmed by small-angle X-ray scattering spectroscopy. SPAEK copolymer membranes show excellent oxidation stability.

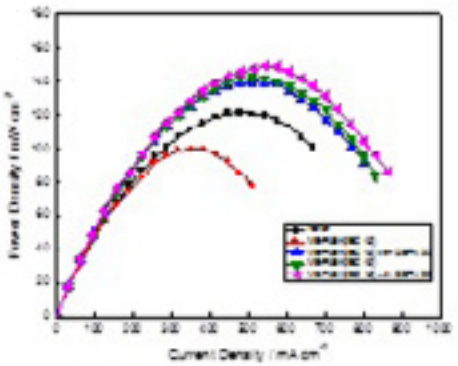

Figure: Cell performance of SPAEK membranes in comparison with Nafion

Biography

Dukjoon Kim has completed his PhD from Purdue University and Postdoctoral studies from Lehigh University. He was the Executive Director of Korea Polymer Society and now the Director of BK 21 Program in SKKU. He has published more than 170 papers in reputed journals on functional polymer material files.

djkim@skku.edu

Notes: