

### Surface-Modified Polymer Electrolyte Membrane via Direct Fluorination Method

이소영, 이영무<sup>1,\*</sup>, 강나래<sup>1</sup>, 신동원, 박치훈  
한양대학교 화학공학과; <sup>1</sup>한양대학교 에너지공학과  
(ymlee@hanyang.ac.kr\*)

Sulfonated poly(phenylene sulfide sulfone nitrile)(SPSSN), which exhibited high performances owing to the introduction of thioether and nitrile group in the polymer backbone. Their presence improved the hydrolytic and oxidative stabilities lowering the water uptake as well as swelling without and significant decreased in proton conductivity. To fulfil another major requirement of fuel cell, adhesive property of membrane to catalyst layer, surface fluorination technique is emerging. The application of this fluorination technique on random copolymer matrix has shown a well defined continuous ionic channel structure, similar to those of multiblock copolymer, due to the low surface free energy of the C-F bonds on the membrane. For this reason, we have investigated the surface modification of SPSSN membranes for its utilization as a fuel cell membrane with high proton conductivity, low water uptake and improved dimensional stability compared to unmodified pristine membrane. The improvements in the properties were led by the synergy effect of -CN- group present in the polymer backbone. Furthermore, this surface enrichment of fluorine atoms led to a low interfacial resistance between membrane and catalyst layer with Nafion ionomer.