

### A phosphoric acid doped organic-inorganic composite membrane for high temperature PEMFCs

허필원\*, 김기현, 최경환, 박찬호  
삼성종합기술원  
(pilwon.heo@samsung.com\*)

High temperature proton exchange membrane fuel cells (HT-PEMFCs), which are able to operate at temperature above 100°C under non-humidified conditions, have been extensively studied for their commercialization with many advantages over the low temperature PEMFCs.

Phosphoric acid (PA) doped polybenzimidazole (PBI) membrane is regarded as one of promising electrolyte membranes for HT-PEMFCs due to its thermal stability and high proton conductivity at around 150°C. Recently, the PA doped membrane can be improved by cross-linking of polybenzoxazine into the PBI, resulting higher cell performance and longer lifetime in the fuel cell operation.

In the other hand, it has been reported that some inorganic proton conductors such as pyrophosphate ( $\text{Sn}_{0.9}\text{In}_{0.1}\text{P}_2\text{O}_7$ ) exhibited high proton conductivities above  $10^{-2} \text{ Scm}^{-1}$  around 100~200°C under unhumidified conditions.

Here, we investigated organic-inorganic composite membrane for HT-PEMFCs to improve proton conductivity as well as mechanical properties in the PA doped membrane system.