

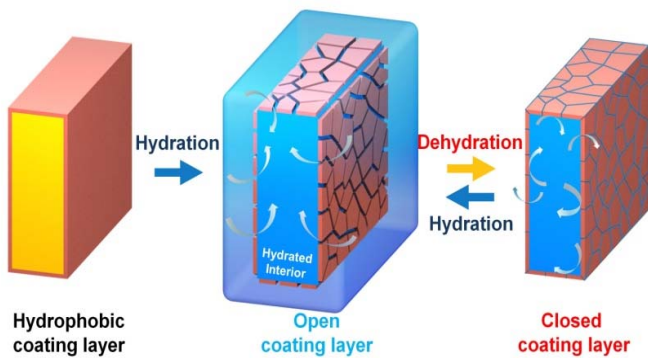
# Self-humidifying Fuel Cell Membranes

*Cactus-inspired Nano-crack Regulated Fuel Cell Membranes*

## TECHNICAL FEATURES

### About Self-humidifying Membrane

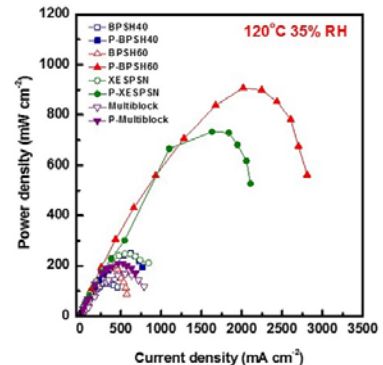
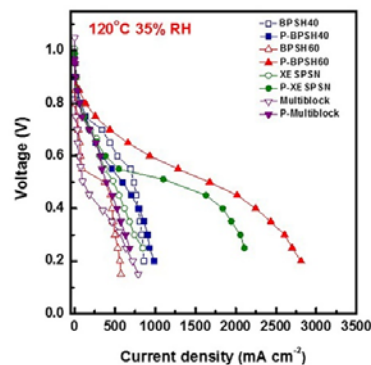
- The self-humidifying membrane can regulate the water content in polymeric membrane
- “Nano-crack” is formed by plasma treatment
- Nano-cracks work as nanoscale valves to retard water desorption and to maintain ion conductivity in the membrane on dehumidification



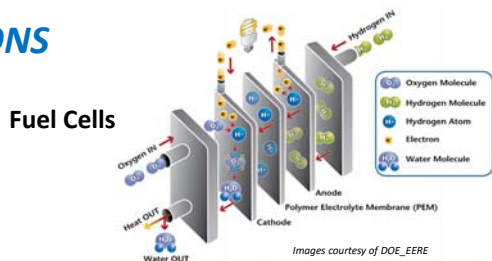
*Park et al., Nature, 532, 480-483 (2016)*

### Significant Characteristics

- Economic feasibility
  - Hydrocarbon membranes coated with thin plasma coating are **5** times cheaper than the commercial membrane for fuel cells (Nafion)
- Excellent PEMFC performance at high temperature and low humidity condition

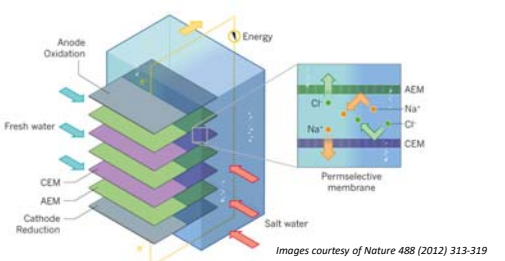


## APPLICATIONS



*Images courtesy of DOE\_EERE*

### Reverse Electro Dialysis (RED)



*Images courtesy of Nature 488 (2012) 313-319*

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