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# 超耐久性燃料電池触媒の開発

## Development of Remarkably Durable High Temperature Polymer Electrolyte Fuel Cell

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Low durability of polymer electrolyte fuel cell (PEFC) is a major drawback that should be solved. Recent studies revealed that, in high temperature PEFC, leaching of liquid phosphoric acid (PA) from both polymer electrolyte membrane and catalyst layers causes inhomogeneous PA distribution that results in deterioration of PEFC performance during long-term operation. Here we describe the finding that a novel PEFC free from acid leaching shows remarkable high durability (single cell test: >400,000 cycling) together with a high power density (252 mW/cm$^2$) at 120˚C under a non-humidified condition. This is achieved by using a membrane electrode assembly (MEA) with poly(vinylphosphonic acid)-doped poly poly(benzimidazole)-wrapped carbon nanotube/Pt electrocatalyst and poly(vinylphosphonic acid)-doped poly(benzimidazole) for the anode and cathode catalysts and electrolyte membrane material, respectively (Figure 1). Such a high performance PEFC opens the door for the next-generation PEFC for “real world” use.

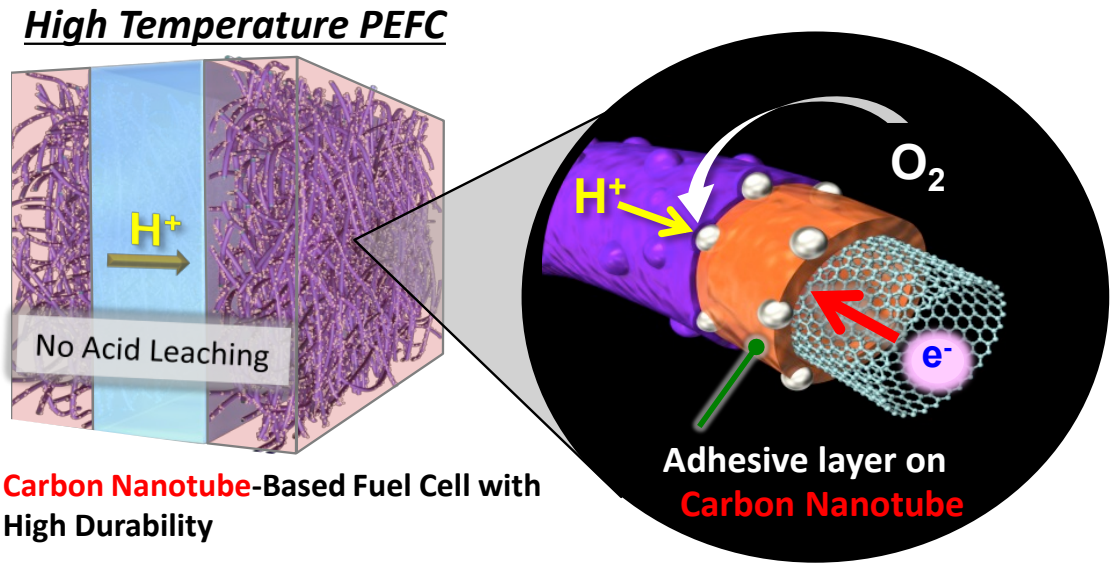


**Figure 1**. Schematic drawing of a CNT-based fuel cell that exhibiting a remarkable durability.