



# Yamaguchi-Tamaki Lab

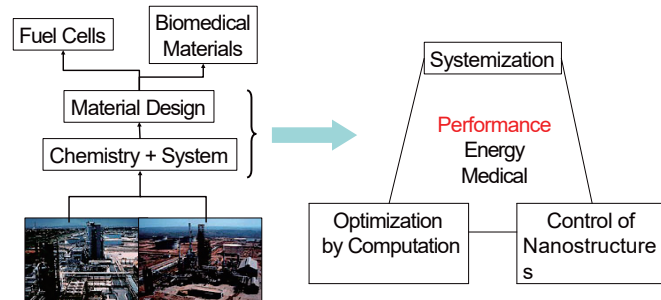
## Construction of Advanced Chemical System for Environment and Sustainable Development

Laboratory for Chemistry and Life Science, Molecular Functions Divisions

<http://www.res.titech.ac.jp/~zairyosys/yamaguchilab/index.html>

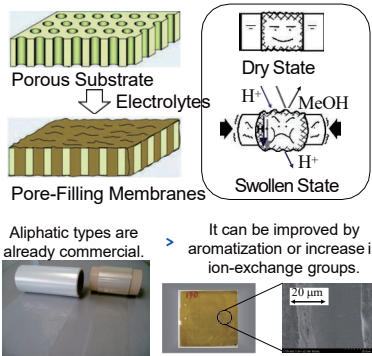
- Systematic Material Design
- Fuel Cell Systems
- Membrane/Catalyst Technology
- Prospective Biomedical Materials

### Research Strategy



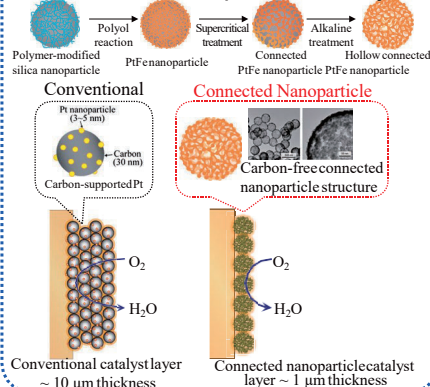
### <Membrane>

#### Pore-Filling Membranes



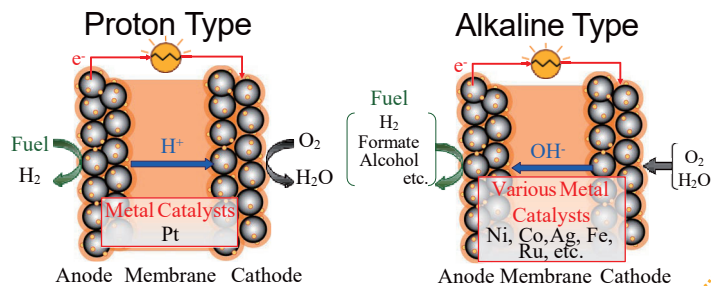
### <Catalyst>

#### Connected Nanoparticle Catalyst

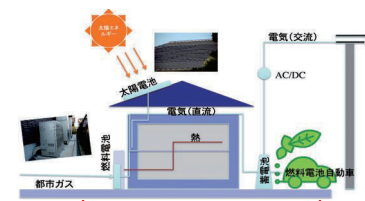


### Fuel Cell System

Overall Development of Membranes, Catalysts, and Catalyst Layers to Establish High-Performance Fuel Cells ~ Nanotechnology-Device Techniques ~



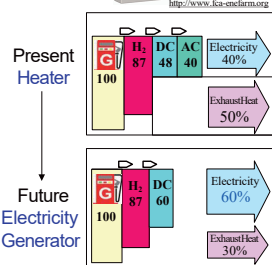
### Life Style in the Future Society Conserving Energy Resources



#### Stationary Fuel Cells



#### Fuel Cell Vehicles



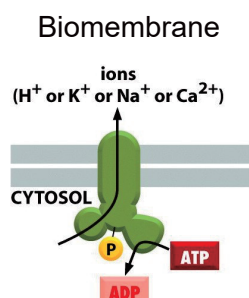
| Energy Efficiency of Automobiles (Tank to wheel) |     |           |
|--|-----|-----------|
| Present Automobiles                              | 13% | 1         |
| Optimal Hybrid Cars                              | 35% | 2.7 times |
| FCV operated at 0.96 V                           | 80% | 6 times   |
| Lightening to 1/2                                |     | 12 times  |

Even if the number of sold automobiles reaches 6 times in 2050, the amount of emitted CO<sub>2</sub> is half.

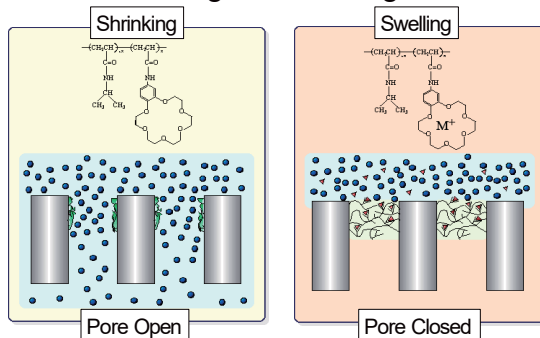
Contributing to Global Environment

### Prospective Biomedical Materials

*inspired by living body and exceeding it*



#### Molecular Recognition Gating Membrane



artificial membrane responding to specific ions

### Drug Delivery, Biosensors, Nano-Biochips, Biofuel Cells

### Sustainable Healthy Life

