

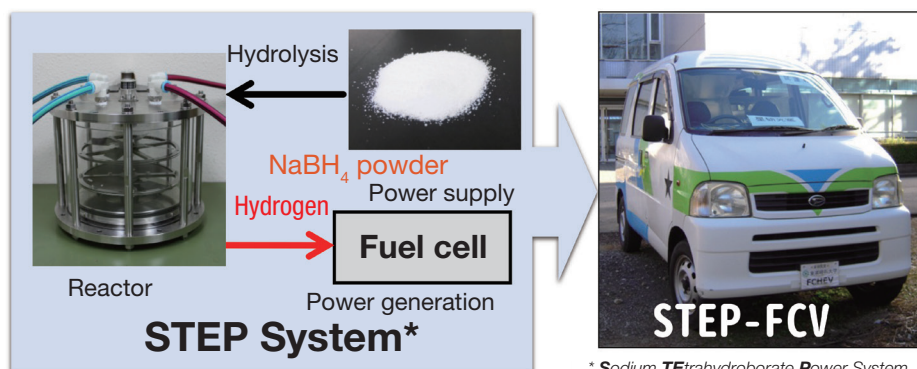
Nobukazu HOSHI (Professor, Department of Electrical Engineering, Faculty of Science and Technology, Tokyo University of Science)  
Noboru KATAYAMA (Junior Associate Professor, Department of Electrical Engineering, Faculty of Science and Technology, Tokyo University of Science)

### Purpose of Research

The building cost for a typical hydrogen station, which is required to feed hydrogen to fuel cell vehicles (FCVs), is estimated to be as high as 400 to 500 million yen. Thus, hydrogen stations are planned to be constructed primarily in metropolitan areas and it likely will take many years for FCV to become popular in provincial areas. In the present study, we propose a power supply system for FCVs and stationary power generation facilities which runs on a hydrogen storage compound so that there is no need for large, expensive infrastructure.

### Summary of Research

In the present research,  $\text{NaBH}_4$  (sodium borohydride) powder is used as a hydrogen fuel to establish a hydrogen supply system with a high volumetric energy density. We are developing an FCV and a stationary power supply system based on this system.



### Comparison with Conventional or Competitive Technology

Because the hydrolytic reaction in this system is exothermic, no external high energy source is required to produce hydrogen.

### Expected Applications

- FCV.
- Power supply for prefab housing, onsite offices, etc.
- Power generation in remote islands.

### Challenges in Implementation

- Smaller reactor.
- Water recycle system.
- Fuel cartridge.
- By-product collection system.
- Fuel regeneration.

### What We Expect from Companies

We seek companies for joint research toward a hydrogen-based society.

### Points

- We developed an FCV fueled by  $\text{NaBH}_4$  powder as fuel. The fuel is hydrolyzed into hydrogen which is converted into electricity by the fuel cells on the vehicle; and vehicle runs by the electricity. Test run is successful.
- 3 kW power supply system based on the proposed system is under development.
- We aim for a society that recycles  $\text{NaBH}_4$  powder produced/rehydrogenated overseas, etc. for use as a hydrogen carrier.

### ■Awards:

Outstanding Paper Award in the 1st International Conference on Renewable Energy Research and Applications, Nagasaki 2012

### Future Developments

A smaller hydrogen generator is necessary for practical application. This will be installed in a miniature car and subjected to a test run, and used in a power generation system for remote islands.

