

# Chinese hydrogen update

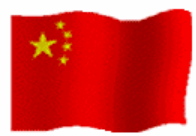
**SHI Dinghuan**

**Ministry of Science and Technology  
China**

**4<sup>th</sup> IPHE steering committee meeting**

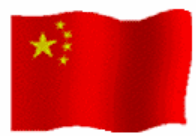
**Kyoto, Japan**

**14 – 15 September 2005**



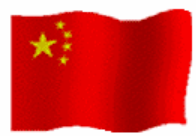
# Outline

- New development on hydrogen energy
- Hydrogen technology demonstration projects
- International hydrogen conferences, workshops or other events
- Code and standard
- Education



## **H<sub>2</sub>/FC- related technology research priority**

- ◆ **Fuel cell car**
- ◆ **Distributed fuel cell**
- ◆ **Hydrogen combustion engine (for car, etc)**
- ◆ **Combined combustion technology for gas and Hydrogen**
- ◆ **Hi-efficient production of Hydrogen through water electrolysis**
- ◆ **Civil wind-hydrogen energy system**
- ◆ **Civil solar-hydrogen energy system**
- ◆ **Hydrogen safety research**
- ◆ **Hydrogen production from Biomass energy**
- ◆ **Hydrogen production from fossil energy and CO<sub>2</sub> treatment technology**



## New Progress in Hydrogen Source System for Large Power Fuel Cells

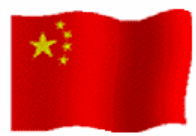
- ◆ The external reformer set-up of natural gas for 50 kW MCFC has been developed and installed, of which the syngas production ability is 100m<sup>3</sup>/h.
- ◆ hydrogen source system of methanol reforming for 75 kW PEMFC , has succeeded in connecting with PEMFC. hydrogen productivity is 70.5 Nm<sup>3</sup> H<sub>2</sub>/h, CO content is 26~28ppm .



The hydrogen source system of methanol reforming- Jiaotong university-DICP,CAS

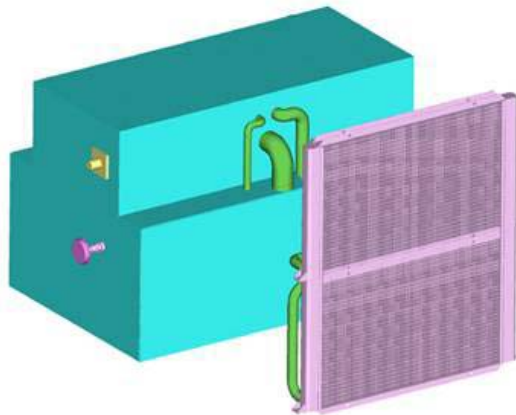


The hydrogen source system of natural gas reforming- Jiaotong university

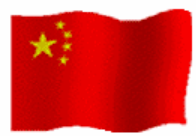


## Development of hydrogen commercialization

The fuel cell tourist vehicle ,developed by Shanghai Shen-Li High Tech Co. LTD, went to the course already to break through 10,000 kilometer since July,2004. the travel time surpassed for 1,000 hours, also the performance was extremely stable.



The domestically first batch 5-10kw small hydrogen power stations are penetrating to the market in shanghai.



## **National hydrogen & fuel cell commercialization base is founded**

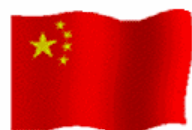
- ◆ **The base is co-constructed by Yixing city government, Dalian institute of chemical physics, CAS and Dalian sunrise power CO.LTD**
- ◆ **The total investment is 2 billion RMB**
- ◆ **The base will be built as china fuel cell industrialization demonstration and products transform of “863”program base**



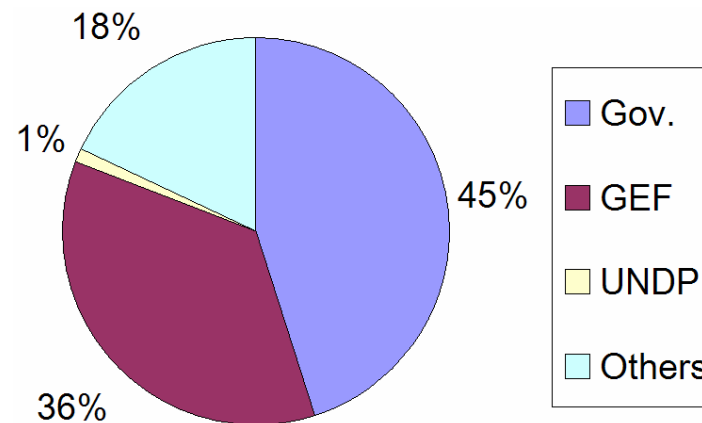
# China new energy demonstration park (in process or draw out)







# China FCB Demo Project sponsored by GEF/UNDP

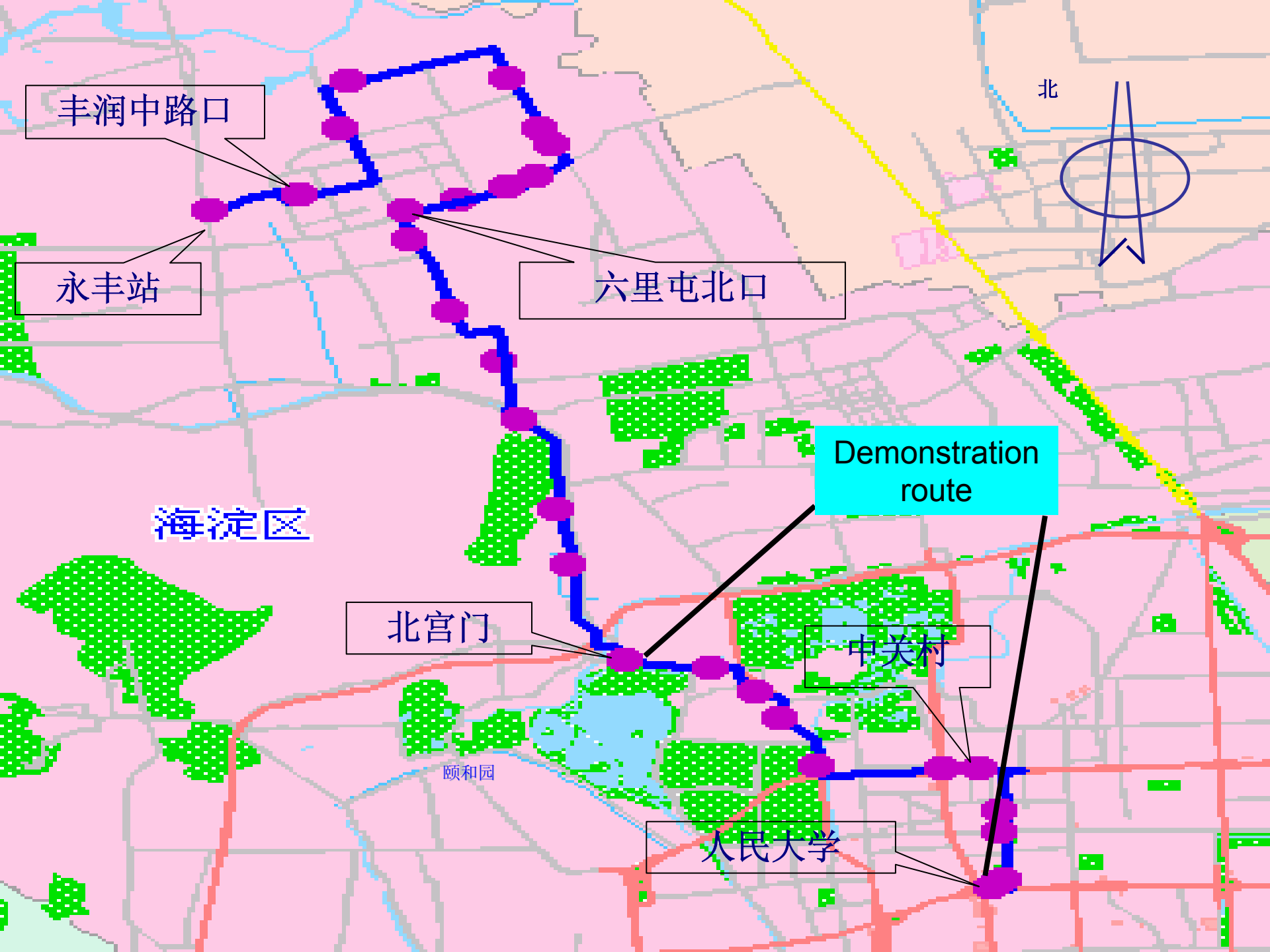


6-9 Fuel Cell Buses & 40,000 km demonstration

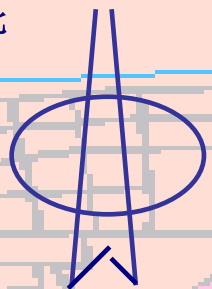
Timing and Budget: 5 years, ~US\$32M







北



丰润中路口

永丰站

六里屯北口

Demonstration route

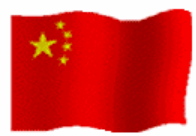
海淀区

北宫门

中关村

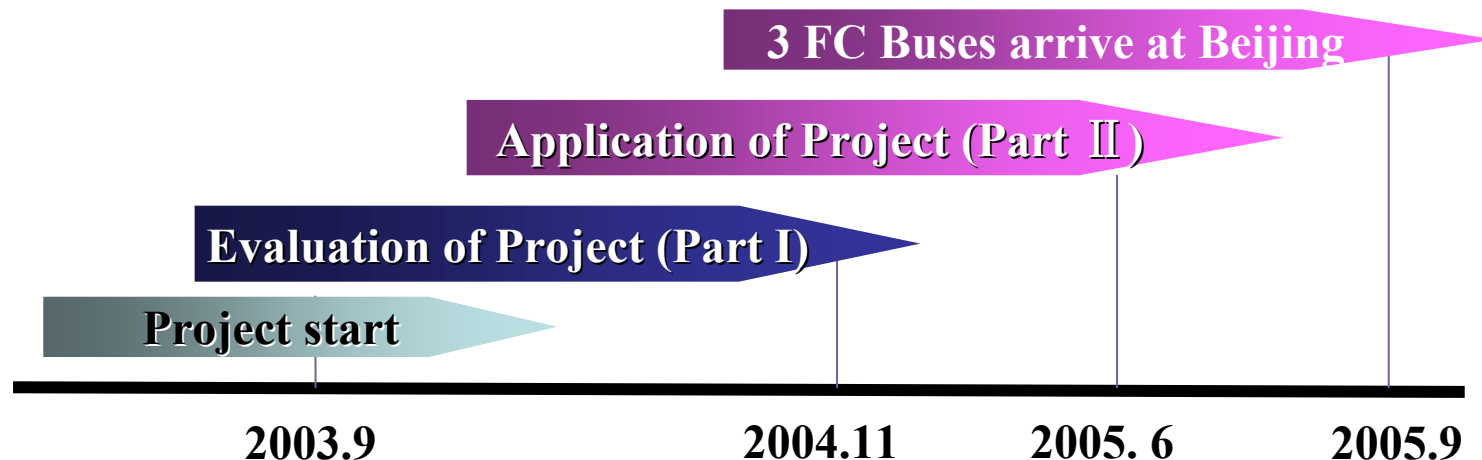
中国人民大学

颐和园

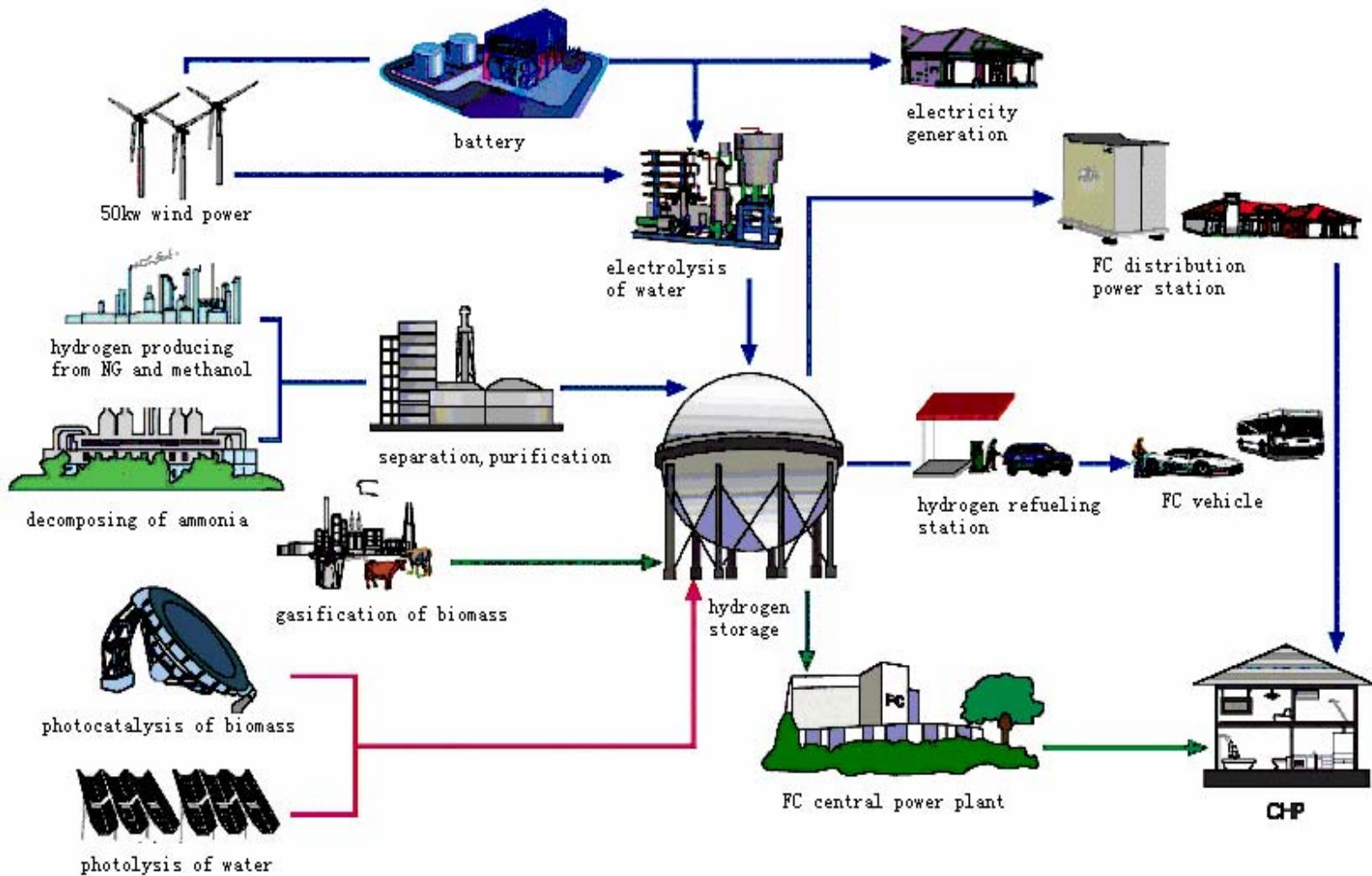


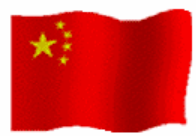
# Milestone of project

- ◆ In september,2003, China FCB demonstration project started up.
- ◆ In November, 2004 ,An evaluation of project part I was conducted. The evaluation mission gave high appraisalment for the project achievement.
- ◆ Project part II application for shanghai is being developed.
- ◆ 3 fuel cell buses made by DaimlerChrysler , will shipped to Beijing on september,2005 after certified by Chinese expert team



# Dalian New Energy Demonstration Zone





# Project Outline

## Hydrogen Producing:

- ◆ electrolysis of water with wind power and solar energy
- ◆ reforming of nature gas and methanol
- ◆ decomposing of ammonia
- ◆ gasification of biomass
- ◆ photocatalysis of biomass conversion

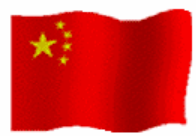
## Hydrogen Storage and Refueling System

## Hydrogen Utilization:

- ◆ fuel cell vehicle and fuel cell plant

## Energy Museum for new energy and energy-saving



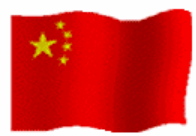


# International hydrogen events

**3<sup>rd</sup> Sino-Germany workshop on fuel cell  
May 2005, Shanghai**

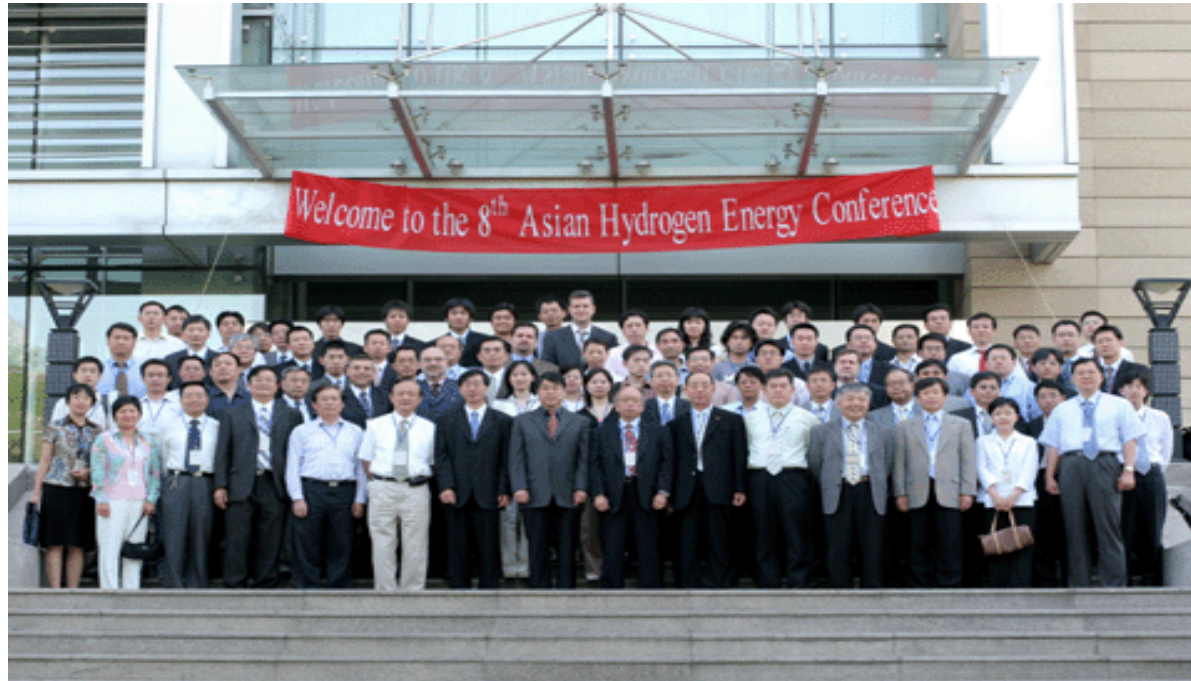


**More than 40 experts from China and Germany talked about the progress of hydrogen & fuel cell technology in detail at the 3rd Sino-Germany workshop, sponsored by the Sino-Germany center for research promotion of NSFC and DFG, organized by Shanghai JiaoTong university, DICP, CAS and Center for solar energy and hydrogen research in Ulm.**

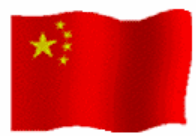


# International hydrogen events

**8<sup>th</sup> Asian Hydrogen Energy Conference,  
may 2005, Beijing**



**The 8<sup>th</sup> Asian hydrogen energy conference was held in Tsinghua university on may 26-27,2005. More than 80 representatives from Asian, USA, UK, Canada participated in this meeting.**



# International hydrogen events

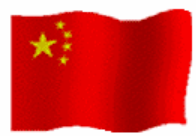
A China -UK symposium on hydrogen energy  
May 29 2005,Dalian



A China -UK symposium on hydrogen energy was sponsored by CAS, the National Natural Science Foundation of China (NSFC), the Royal Society in UK and the BP Group.

As a component of the UK-China Partners in Science program, this meeting provides a forum for scientists from the both sides to share development on hydrogen energy, including strategy, national standards, demonstration.



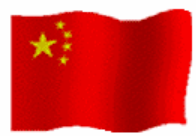


## Code & standard

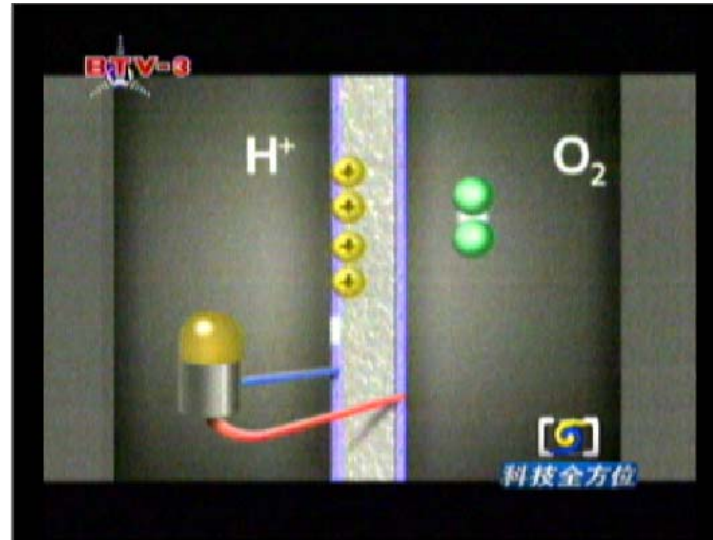
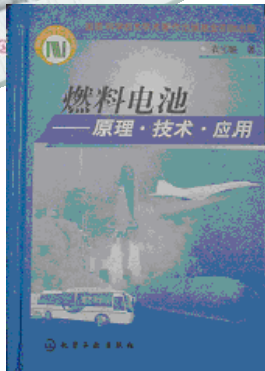
**Fuel cell code and standard have been identified as one of key element for realizing hydrogen economy.**

- ◆ **The project, “key technology standard research of new energy and renewable energy-PEMFC ”, had been awarded by Beijing institute of electric technology, mechanic industry and Dalian sunrise power CO.,LTD.**
- ◆ **3 documents on standard of PEMFC had been drafted by Dalian sunrise power CO.,LTD.**
  - **“PEMFC stack”**
  - **”portable PEMFC stack”**
  - **”performance test approach of stationary PEMFC power system”**
- ◆ **Standard of fuel cell bus is developed by office of demonstration for FCB commercialization in china**





# education





**Thanks for your Attention**