The 7th CE-CERT-SJTU Student Symposium

Center for Combustion and Environmental Technology (CCET), SJTU

Associate Professor, He Lin

UC-Riverside, Dec. 8, 2011
# 1. Overview of CCET

## 1.1 Group Faculty of CCET

<table>
<thead>
<tr>
<th>Prof. Wenfeng Shangguan</th>
<th>Prof. Xinqi Qiao</th>
<th>Dr. Wugao Zhang</th>
<th>Dr. He Lin</th>
<th>Dr. Xingcai Lv</th>
<th>Dr. Jian Yuan</th>
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<tr>
<td>Dr. Xiaoling Chen</td>
<td>Dr. Xiaomin Xie</td>
<td>Dr. Junhua Fang</td>
<td>Dr. Jin Xiao</td>
<td>Dr. Zhi Jiang</td>
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Prof. Zhen Huang, Cheung Kong Chair Professor of Ministry of Education
1. Overview of CCET

1.1 Graduate students of CCET

40 Ph.D. candidates; 56 Master candidates
Our Mission

Advancing the fundamental understanding of fuel and energy conversion processes, and accelerating innovation of clean combustion, alternative fuels for the next generation of vehicles.
Research area:

New engine combustion concept

Alternative fuel for transportation

Spray, combustion and engine technology

Fuel production and environmental technology
2. Research activities of CCET

2.1 Research Highlights

Highlight 1: New engine combustion concept (HCCI, LTC)

Active Fuel Design and Management for HCCI

**Physical properties**

**Chemical properties**

Octane number  
Cetane number

Fuel/air mixture preparation  
Control ignition timing and combustion phase

Full load, High efficiency, Ultra-low emissions
2. Research activities of CCET

2.1 Research Highlights

Highlight 1: New engine combustion concept (HCCI, LTC)

This work has been cited 276 times by international journals in recent 5 years.
Highlight 2: Alternative fuel (DME, Bio-fuels) for transportation

DME - A Solution for Energy Security in China

Multi-source
- Coalbed methane
- Coal
- Natural gas
- Biomass
- Renewable energy

Multi-use
- CO + H₂ → DME
- CO₂ + H₂ → DME

DME Economy
- Vehicle Transportation
- LPG alternative household
- Refrigerant

DME Economy
- DME manufacturing
- DME
- Alternative fuel
- Carbon-Neutral
2. Research activities of CCET

2.1 Research Highlights

Highlight 2: Alternative fuel (DME, Bio-fuels) for transportation

- The DME engine satisfies the Euro V emission regulation and is smoke-free.
- A fleet of DME buses has been put into public use for demonstration in 2010.
2. Research activities of CCET

2.1 Research Highlights

Highlight 3: Fuel Production and Environmental Technology

Fuel Production

- Photocatalytic splitting water into hydrogen in one step by sunlight.

- Focus on developing high-efficiency nano-size photocatalysts.

\[ 2H_2O \xrightarrow{\text{photocatalyst}} 2H_2 + O_2 \]
2. Research activities of CCET

2.1 Research Highlights

Highlight 3: Fuel Production and Environmental Technology

Environmental Technology

- A new diesel emissions control concept – to remove nitrogen oxides (NOx) and soot through the catalysis redox reaction between NOx and soot.

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<tr>
<th>Journal Title</th>
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<th>Impact Factor</th>
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<tr>
<td>Applied Catalysis B-Environmental</td>
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<tr>
<td>Proceedings of the Combustion Institute</td>
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<td>Combustion and Flame</td>
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<td>Catalysis Communications</td>
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<td>Catalysis Letters</td>
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The research papers have been cited more than 300 times by international SCI journals.

Shanghai Natural Science Award in 2009
2. Research activities of CCET

Highlight 3: Fuel Production and Environmental Technology

**Environmental Technology**

A breakthrough was made in SCR catalyst with High-Temperature Synthesis Method.

The new SCR catalyst shows much better performance than commercial SCR catalyst at low temperature (L-T) zone.

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<tr>
<td>Fuel</td>
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<td>Catalysis Communications</td>
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<tr>
<td>Industrial &amp; Engineering Chemistry Research</td>
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<td>1.758</td>
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3. International Activity

3.1 Cooperation with world-wide University

1st annual-student-exchange of SJTU-UCR

6th annual-student-exchange of SJTU-UCR
Welcome to Shanghai and CCET next year.

Thank you for your attention.