# **HU-ACE NEWS LETTER**

**Advanced Core for Energetics, Hiroshima University** 

ctivities of the Core	
Apr. 22, 2025	The 103th HU-ACE Steering Committee Meeting
Apr. 23, 2025	The 120th Hiroshima University Biomass Evening Seminar (co-organized by HU-ACE)
Apr. 26, 2025	Associate Professor W. Kim to Deliver Invited Lectures in Korea National University of Transportation, Chungju, South Korea on "Explosion Safety of Chemical Substances: Fundamentals, Industrial Applications, and Recent Research Trends"
Apr. 29, 2025	Associate Professor W. Kim to Deliver Invited Lectures in Harbin Engineering University, China on "Recent Advances in Hydrogen Research: Combustion Characteristics and Safety Measures for Explosion Prevention"

# Introduction of Hiroshima University Biomass Premium Evening Seminar

Launched in March 2021, the Hiroshima University Biomass Premium Evening Seminar is held four times a year (once every three months). The seminar invites distinguished experts with extensive knowledge in the field of biomass to deliver lectures, with the aim of contributing to the advancement of biomass technologies and research. Although there is a participation fee, it is set at a relatively affordable rate. The seminar is conducted online, allowing participants from distant locations to attend without the burden of travel. The seminar has been well received on every occasion. In the most recent session held in March, Prof. Toshihiko Nakata from Tohoku University delivered a lecture on energy systems including biomass. Prof. Nakata also provides an informative website (https://energy-sustainability.jp/) that not only helps users understand Japan's energy flow but also allows them to run simulations. For the upcoming June seminar, we are honored to welcome Dr. Akihiko Kondo, former Executive Vice President of Kobe University and currently the President and CEO of Bacchus Bio Innovation Co., Ltd., as our guest speaker. We hope you will take this valuable opportunity to join us.

# **Related Events**

May. 27, 2025: 16:20-17:50The 121th Hiroshima University Biomass Evening Seminar (co-organized by HU-ACE)Jun. 19, 2025: 16:30-18:00The 18th Hiroshima University Premium Biomass Evening Seminar (co-organized by<br/>HU-ACE)HU-ACE)HU-ACE

Jun. 30- Jul. 1, 2025: The 9th International Symposium on Fuels and Energy (ISFE2025) Jul. 31, 2025: 16:20-17:50 The 122th Hiroshima University Biomass Evening Seminar (co-organized by HU-ACE)

Contact us for more information : hu-ace-info@ml.hiroshima-u.ac.jp

# esearch consultation and joint research are welcome.

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# Do You Know Energy

# **Biodiesel**

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#### **Research fields:**

Engineering;Integrated engineering;Energy engineering. **Keywords**: Biomass Organic Waste, Supercritical Fluid

# What is Biodiesel?

Diesel vehicles typically run on petroleum-based diesel fuel. However, it is possible to produce a diesel-like fuel by reacting vegetable oil with methanol in the presence of an alkaline catalyst. This fuel is known as biodiesel.While conventional diesel emits carbon dioxide ( $CO_2$ ) derived from fossil sources, biodiesel is made from plant-based oils, which are produced through photosynthesis. As a result, the carbon released during combustion was originally captured from the atmosphere, meaning biodiesel does not contribute to a net increase in atmospheric  $CO_2$ .

# How is Biodiesel Produced?

Biodiesel is produced by reacting vegetable oil with methanol. Since these two substances do not mix easily, the mixture is vigorously stirred while adding an alkaline catalyst such as sodium hydroxide or potassium hydroxide. This reaction typically occurs under relatively mild conditions, around 60 to 70° C.After the reaction, the mixture is left to settle, allowing it to separate into two layers: biodiesel and glycerin. The biodiesel layer is then washed with water to remove impurities such as soap that may have formed during the process.

# Why is Biodiesel Important?

Even with the growing adoption of electric vehicles, large vehicles like trucks and buses are still expected to rely on liquid fuels. This is because large vehicles require more energy, and the batteries needed to store that energy take up a significant amount of space—reducing cargo or passenger capacity.Biodiesel, produced from renewable resources, is an ideal alternative to conventional diesel fuel in such applications.



Global biodiesel production has been increasing steadily year by year. As we move toward realizing a carbon-neutral society by 2050 or 2060, biodiesel is expected to become an indispensable fuel, and its demand and usage are likely to continue growing. Furthermore, advancements in new technologies are anticipated, such as hydrotreated biofuels produced by reacting vegetable oils with green hydrogen derived from surplus electricity, biodiesel made from oils extracted from microalgae, and methods using supercritical methanol that allow the reaction to proceed without a catalyst. These innovations are expected to play a significant role in enhancing both the efficiency and sustainability of biodiesel production in the future.







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