Successful Development of Prototype Room-Temperature Nuclear Fusion Heater: 2,000W Heat Output with Only 400W Input Power

A single hydrogen fuel charge enables continuous operation for 10 years Japan-developed next-generation energy technology aims for practical implementation by 2027

May 1, 2025

Cool Fusion Inc.
Hydrogen Engineering Application & Development Company.

Cool Fusion Inc. (Headquarters: Minato-ku, Tokyo, Representative: Ryosuke Okada) and Hydrogen Engineering Application & Development Company. (Headquarters: Sapporo, Hokkaido, Representative: Tadahiko Mizuno) have **successfully developed the first prototype heat module utilizing revolutionary "cold fusion" energy technology**. In experiments, the module achieved heat output of approximately 2kW with input power of only 400W, **achieving energy efficiency of approximately 5 times the input**.
This technology can be applied to a wide range of applications from heating to industrial heat sources, contributing to reduced electricity costs and the realization of a carbon-neutral society.

Unlike conventional high-temperature plasma fusion, this cold fusion technology **enables nuclear fusion reactions in low-temperature, low-pressure environments**. Using light hydrogen reactions, it is gaining attention as the **ultimate clean energy source that ensures safety while producing no carbon dioxide emissions**.

Stable operation has been confirmed for 5 months from November 2024 to March 2025, and mass production will solve energy problems worldwide.

Heat Module Ver.1

Heat Module Ver. 1 demonstrates stable operation for 5 months

Our "Heat Module Ver.1" has **successfully generated approximately 2,000W of heat output with just 400W of electrical input**. This translates to **producing about 5 times the input energy**. The prototype has maintained stable operation from November 2024 to March 2025, consistently maintaining high thermal efficiency (**Coefficient of Performance (COP) of approximately 5.0**).

The reaction module consists of a metal reactor approximately 7 centimeters in diameter and 30 centimeters in length. Light hydrogen gas is sealed within precisely machined metal components, which, when heated to 300-500°C, continuously generates heat energy significantly exceeding the input energy.

Five Benefits That Will Transform Winter Living

- **Significant utility cost reduction** - Approximately **64% electricity cost savings** compared to conventional air conditioning heating
- **No fuel exchange required** - **Continuous operation for approximately 10 years** with a single hydrogen filling
- **Stability unaffected by outdoor temperature** - **No efficiency reduction even in severe cold**, providing consistent warmth
- **Zero CO2 emissions** - **Clean energy** with no carbon dioxide emissions during operation
- **Quiet design** - **Approximately 10dB quieter than conventional air conditioners** (below 40dB)

Comparison with Conventional Fusion Technology

- **Safety**: **Higher safety** compared to conventional nuclear power or high-temperature plasma fusion
- **Environmental impact**: **Clean energy** with no carbon dioxide emissions
- **Economic efficiency**: Long-term operation with light hydrogen (expected **continuous operation for approximately 10 years without fuel replenishment**)
- **Practicality**: **Applicable to both small-scale and large-scale facilities**

History of Cold Fusion Technology and Dr. Mizuno's Contribution

Dr. Tadahiko Mizuno has continued cold fusion research for 35 years, paving the way toward practical applications. Dr. Mizuno specializes in electrochemistry, applied physics, metallurgical engineering, and atomic physics at Hokkaido University and is recognized as a global authority in cold fusion research.

Dr. Mizuno's research excellence has been highly evaluated internationally. In 2004, he was awarded the "Giuliano Preparata Medal" from the International Conference on Cold Fusion (ICCF), one of the most prestigious international awards in cold fusion research. He has also received the Thermal and Electric Energy Technology Foundation Award multiple times, consistently receiving high academic recognition.

Future Outlook

To steadily advance the social implementation of cold fusion technology, we are adopting a phased approach.

Moving forward, we plan to strengthen collaboration with local governments and research institutions, first conducting demonstrations in socially significant areas such as emergency power sources for disasters and heating support in cold regions.

First Phase (2025-2027): Demonstration experiments and performance optimization as industrial heat source modules

Second Phase (2028-2030): Development and demonstration of thermal power generation systems

Third Phase (2030 onwards): Expansion to various industrial applications and international deployment

Differences from Conventional Fusion Research

Current high-temperature plasma fusion research struggles to achieve COP 1 (energy output equivalent to energy input), with a practical implementation target of 2050. In contrast, Cool Fusion Inc.’s cold fusion technology has already achieved COP 5 and aims to commercialize products with even higher COP by 2030.

There are also significant differences in development costs. High-temperature plasma fusion requires enormous experimental facilities and substantial research funding, while cold fusion can be researched and developed with relatively small-scale facilities, offering the advantage of lower barriers to practical implementation.

Dr. Mizuno's Comments

"When cold fusion was first announced 35 years ago, there were many skeptical opinions, but through years of research, we have clarified the mechanism of stable excess heat generation and established a path to practical applications. **If this technology becomes widespread, it has the potential to solve not only energy problems but also various international issues such as preventing global warming through carbon neutrality and reducing economic disparities. I am proud that this Japanese-developed technology can contribute to the world**."

CEO Okada's Comments

"Cold fusion technology, as a deep tech that Japan can be proud of globally, can be a fundamental solution to the critically important energy issues facing humanity. Based on Dr. Mizuno's 35 years of research achievements, **our company will advance the commercialization of this revolutionary technology**. To create an energy revolution and contribute to the realization of a decarbonized society, **we are actively considering collaborations with many companies and institutions**."

About Cool Fusion Inc.

Company Name: Cool Fusion Inc.

Representative: CEO Ryosuke Okada

Founded: February 14, 2024

Business Overview: Commercialization of cold fusion technology and research and development of related technologies

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Website: https://coolfusion.jp/

About Hydrogen Engineering Application & Development Company.

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Representative: Tadahiko Mizuno

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