



Plasma Treatment within Dielectric Fluids

INVENTORS • Ferencz Denes, Sorin Manolache

WARF: P03049US

[View U.S. Patent No. 7,510,632 in PDF format.](#)

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method for producing a plasma discharge in liquids at low temperatures and atmospheric pressure that can be used to treat gasoline and other liquid fuels to increase combustion efficiency.

OVERVIEW

Conventional techniques for generating plasmas aren't suitable for plasma reactions in liquids such as gasoline or diesel fuels. They are inefficient and can result in significant heat and unwanted effects.

THE INVENTION

UW-Madison researchers have developed a method for producing a plasma discharge in liquids at low temperatures and atmospheric pressure. It shows particular promise for treating gasoline and other liquid fuels to increase combustion efficiency.

In the method, bubbles of gas or vapor are first created within a liquid through mechanical, chemical or other means. Next, the liquid is subjected to an electric field that generates micro-discharges, and thus a plasma state, within the bubbles. Unlike previous techniques aimed at treating liquids by dielectric barrier discharge (DBD) plasma processes, this method produces a very large plasma/liquid interface per unit volume of liquid. This feature is needed to treat the entire liquid volume without causing heating or other unwanted effects.

Using this process, the researchers have shown that octane can be broken down into lower molecular weight compounds of higher burning efficiency. Thus, this technology could potentially be used for in-line treating of gasoline and diesel fuels prior to fuel injection, to increase combustion efficiency and possibly reduce emissions.

THE WARF ADVANTAGE

Since its founding in 1925 as the patenting and licensing organization for the University of Wisconsin-Madison, WARF has been working with business and industry to transform university research into products that benefit society. WARF intellectual property managers and licensing staff members are leaders in the field of university-based technology transfer. They are familiar with the intricacies of patenting, have worked with researchers in relevant disciplines, understand industries and markets, and have negotiated innovative licensing strategies to meet the individual needs of business clients.



APPLICATIONS

- Treating gasoline and other liquid hydrocarbon fuels to increase combustion efficiency and reduce emissions

KEY BENEFITS

- Readily implemented within an engine's fuel line directly upstream of the fuel injector
- System can operate in liquid media under either batch or continuous flow modes.
- Eliminates heating of liquid and other unwanted side effects by using micro-discharge rather than streamer-type plasma discharges
- Efficient—unlike previous techniques, effectively treats entire liquid volume, not just the liquid lying along the discharge path

ADDITIONAL INFORMATION

Tech Fields

Clean Technology - Transportation

Clean Technology - Energy & resource efficiencies

Plasma Processing - Materials processing

CONTACT INFORMATION

For current licensing status, please contact Mark Staudt at mstaudt@warf.org or 608-960-9845.

