



# University of Central Florida

Technology Available for Licensing

tt.research.ucf.edu

## Perovskite Catalysts for Porous Media in Internal Combustion Engines

### Introduction

Porous burner technology in internal combustion engines fuels everyday machines including water heaters, gas stoves, boilers, and portable generators, along with turbine combustion chambers and more. Conventional engines have relied on complex control equipment and large devices whose configurations created undesirably large pressure drops across the combustion chambers, compromising ideal combustion efficiency while requiring intricate control systems, making them impractical for use outside of academia.

### Advantages

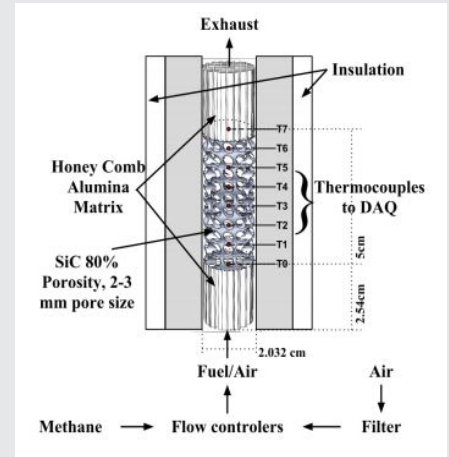
UCF researchers have developed a simple, but significant, improvement for porous media, a critical component of internal combustion engines and the applications that rely on them, with a catalyst enhancement to improve temperature conditions for more efficient fuel-burning. The new catalyst-coated porous media enables combustion of lean mixtures—fuels with a high percentage of air and a low percentage of fuel—which allows for fuel flexibility. This makes more energy per dollar possible since applications can burn low-calorific fuels that generate fewer harmful emissions. Simple, efficient porous media minimizes environmental contamination and conserves energy resources without sacrificing performance. This porous burner technology is critical when generating power from thermoelectric devices, small-scale heating, and combustion of low-calorific value landfill-seepage gases.

### Technical Details

By coating porous media, such as a high temperature ceramic comprising alumina and/or silicon carbide, with perovskite catalysts—materials with a crystal structure  $ABO_3$ —the temperature within the media can be 1) high enough to support heat and power applications while also 2) low enough for the catalysts to remain active and keep materials in the combustion chamber from degrading as they would at uncontrolled high temperatures.

### UCF Inventors

Nina Orlovskaya, Ph.D.; Ruey-Hung Chen, Ph.D.; Manuel Robayo



### Benefits

- More efficient combustion
- Fuel flexibility: Power from lean mixtures
- Smaller equipment requirements
- Little-to-no maintenance
- No complicated control system needed
- Less environmental contamination, when burning low-calorific fuels

### Applications

- Internal combustion engines: water heaters, gas stoves, boilers, portable generators

### Tech Fields

Clean Technologies

### Keywords

internal combustion engine, porous media, ceramix matrix, natural gas, perovskite catalyst, lean fuel mixtures

**If you or your company are interested in this opportunity, Contact:**

Raju Nagaiah | 407.882.0593 | Raju@ucf.edu | Tech ID# 32901

UCF Office of Technology Transfer | 12201 Research Parkway, Suite 501, Orlando, FL 32826