



**The Combustion Institute**

5001 Baum Boulevard, Suite 644  
Pittsburgh, Pennsylvania 15213-1851 USA

Ph: (412) 687-1366

Fax: (412) 687-0340

Office@CombustionInstitute.org

CombustionInstitute.org

---

## 38<sup>th</sup> International Symposium on Combustion Distinguished Papers

We are pleased to announce the complete list of Distinguished Papers from the 38th International Symposium on Combustion. These papers will now be reviewed by the Silver Medal Committee. Announcement of the medal selection will be made at the 39th Symposium in Vancouver, Canada in 2022. Congratulations to all the authors!

These papers will be available for free download on Science Direct and for viewing on The Combustion Institute website through the end of May 2021. We appreciate the continued support of Elsevier in this effort to make these papers accessible to all our members.

### 1. Gas-Phase Reaction Kinetics

#### ***Automated theoretical chemical kinetics: Predicting the kinetics for the initial stages of pyrolysis***

Sarah N. Elliott<sup>1</sup>, Kevin B. Moore III<sup>2</sup>, Andreas V. Copan<sup>3</sup>, Murat Keçeli<sup>4</sup>, Carlo Cavallotti<sup>5</sup>, Yuri Georgievskii<sup>2</sup>, Henry F. Schaefer III<sup>1</sup>, Stephen J. Klippenstein<sup>2</sup>

<sup>1</sup>Center for Computational Quantum Chemistry, University of Georgia, Athens, GA, 30602, USA

<sup>2</sup>Chemical Sciences and Engineering Division, Argonne National Laboratory, Lemont, IL, 60439, USA

<sup>3</sup>Emmanuel College, Natural Sciences Department, Franklin Springs, GA, 30639, USA

<sup>4</sup>Computational Science Division, Argonne National Laboratory, Lemont, IL, 60439, USA

<sup>5</sup>Department of Chemistry, Materials and Chemical Engineering "G. Natta", Politecnico di Milano, Milan, Italy

### 2. Soot, Nanomaterials, and Large Molecules

#### **Effects of maturity and temperature on soot density and specific heat**

Hope A. Michelsen<sup>1</sup>

<sup>1</sup>Department of Mechanical Engineering, University of Colorado Boulder, Boulder, CO 80309, USA

### 3. Diagnostics

#### **Single-shot imaging of major species and OH mole fractions and temperature in non-premixed H<sub>2</sub>/N<sub>2</sub> flames at elevated pressure**

T.F. Guiberti<sup>1</sup>, Y. Krishna<sup>1</sup>, W.R. Boyette<sup>1</sup>, C. Yang<sup>1</sup>, W.L. Roberts<sup>1</sup>, and G. Magnotti<sup>1</sup>

<sup>1</sup>King Abdullah University of Science and Technology (KAUST), CCRC, Thuwal 23955-6900, Saudi Arabia

### 4. Laminar Flames

#### **The effect of pressure on the hydrodynamic stability limit of premixed flames**

Antonio Attili<sup>1</sup>, Rachele Lamioni<sup>2</sup>, Lukas Berger<sup>1</sup>, Konstantin Kleinheinz<sup>1</sup>, Pasquale E. Lapenna<sup>2,3</sup>, Heinz Pitsch<sup>1</sup>, Francesco Creta<sup>2</sup>

<sup>1</sup>Institute for Combustion Technology, RWTH Aachen University, 52062 Aachen, Germany

<sup>2</sup>DIMA, Sapienza, University of Rome, 00189 Rome, Italy

<sup>3</sup>ENEA C.R. Casaccia, 00123 Rome, Italy

## 5. Turbulent Flames

### **On the combined effect of internal and external intermittency in turbulent non-premixed jet flames**

M. Gauding<sup>1</sup>, M. Bode<sup>2</sup>, D. Denker<sup>2</sup>, Y. Brahami<sup>1</sup>, L. Danaïla<sup>1</sup>, E. Varea<sup>1</sup>

<sup>1</sup>*CORIA – CNRS UMR 6614, Saint Etienne du Rouvray, France*

<sup>2</sup>*Institute for Combustion Technology, RWTH Aachen University, Germany*

## 6. Spray, Droplet, and Supercritical Combustion

### **Combustion of aqueous HAN/methanol propellants at high pressures**

Robert E. Ferguson<sup>1</sup>, Alan A. Esparza<sup>1</sup>, Evgeny Shafirovich<sup>1</sup>

<sup>1</sup>*Department of Mechanical Engineering, The University of Texas at El Paso, 500 W. University Ave., El Paso, TX 79968, USA*

## 7. Detonations, Explosions, and Supersonic Combustion

### **Detonation propagation across a stratified layer with a diffuse interface**

C. Metrow<sup>1</sup>, V. Yousefi<sup>1</sup> and G. Ciccarelli<sup>1</sup>

<sup>1</sup>*Queen's University, Kingston, Ontario, Canada*

## 8. Solid Fuel Combustion

### **A new insight into chemical reactions between biomass and alkaline additives during pyrolysis process**

Wei Chen<sup>1</sup>, Kaixu Li<sup>1</sup>, Zhiqun Chen<sup>2</sup>, MingWei Xia<sup>1</sup>, Yingquan Chen<sup>1</sup>, Haiping Yang<sup>1</sup>, Xu Chen<sup>1</sup>, Hanping Chen<sup>1</sup>

<sup>1</sup>*State Key Laboratory of Coal Combustion, School of Power and Energy Engineering, Huazhong University of Science and Technology, Wuhan 430074, China*

<sup>2</sup>*China-EU Institute for Clean and Renewable Energy, Huazhong University of Science and Technology, Wuhan 430074, China*

## 9. Fire Research

### **An analysis of the stabilization of fire whirls**

Shangpeng Li<sup>1</sup>, Qiang Yao<sup>1</sup>, Chung K. Law<sup>2,3</sup>

<sup>1</sup>*Key laboratory for Thermal Science and Power Engineering of Ministry of Education, Department of Energy and Power Engineering, Tsinghua University, Beijing 100084, China*

<sup>2</sup>*Center for Combustion Energy, Tsinghua University, Beijing 100084, China*

<sup>3</sup>*Department of Mechanical and Aerospace Engineering, Princeton University, Princeton, New Jersey 08544, USA*

## 10. Stationary Combustion Systems and Low Carbon Combustion Technologies

### **Digital twin of a combustion furnace operating in flameless conditions: reduced-order model development from CFD simulations**

Gianmarco Aversano<sup>1,2</sup>, Marco Ferrarotti<sup>1,2</sup>, Alessandro Parente<sup>1,2</sup>

<sup>1</sup>*Université Libre de Bruxelles, Aero-Thermo-Mechanics Departement, Avenue F.D. Roosevelt 51, CP 165/41, 1050 Brussels, Belgium*

<sup>2</sup>*Université Libre de Bruxelles and Vrije Universiteit Brussel, Combustion and Robust Optimization Group (BURN), Brussels, Belgium*

## 11. Reciprocating Internal Combustion Engines

### **Detailed measurements of transient two-stage ignition and combustion processes in high-pressure spray flames using simultaneous high-speed formaldehyde PLIF and schlieren imaging**

Hyung Sub Sim<sup>1</sup>, Noud Maes<sup>1,2</sup>, Lukas Weiss<sup>3</sup>, Lyle M. Pickett<sup>1</sup>, and Scott A. Skeen<sup>1,4</sup>

<sup>1</sup>*Combustion Research Facility, Sandia National Laboratories, Livermore, California, US*

<sup>2</sup>*Department of Mechanical Engineering, Eindhoven University of Technology, Eindhoven MB 5600, Netherlands*

<sup>3</sup>*Institute of Engineering Thermodynamics & SAOT, FAU Erlangen-Nuremberg, Germany*

<sup>4</sup>*Department of Mechanical Engineering, Dixie State University, St. George, Utah, US*

## 12. Gas Turbine and Rocket Engine Combustion

### **Heat-release dynamics in a doubly-transcritical LO<sub>2</sub>/LCH<sub>4</sub> cryogenic coaxial jet flame subjected to fuel inflow acoustic modulation**

C. Laurent<sup>1</sup>, G. Staffelbach<sup>1</sup>, F. Nicoud<sup>2</sup>, T. Poinso<sup>3</sup>

<sup>1</sup>*CERFACS, 42 Avenue Gaspard Coriolis, 31057 Toulouse Cedex 1, France*

<sup>2</sup>*IMAG, Univ. Montpellier, CNRS, Montpellier, France*

<sup>3</sup>*IMFT, All'ée du Professeur Camille Soula, 31400 Toulouse, France*

## 13. New Concepts

### **Kinetic study of plasma-assisted n-dodecane/O<sub>2</sub>/N<sub>2</sub> pyrolysis and oxidation in a nanosecond-pulsed discharge**

Hongtao Zhong<sup>1</sup>, Xingqian Mao<sup>1</sup>, Aric C Rousso<sup>1</sup>, Charles L Patrick<sup>2</sup>, Chao Yan<sup>1</sup>, Wenbin Xu<sup>1</sup>, Qi Chen<sup>3</sup>, Gerard Wysocki<sup>2</sup>, Yiguang Ju<sup>1</sup>

<sup>1</sup>*Department of Mechanical and Aerospace Engineering, Princeton University, Princeton, NJ 08544, USA*

<sup>2</sup>*Department of Electrical Engineering, Princeton University, Princeton, NJ 08544, USA*

<sup>3</sup>*School of Mechanical, Electronic and Control Engineering, Beijing Jiaotong University, Beijing 100044, China*