



## Ronald Hanson

Clarence J. and Patricia R. Woodard Professor of Mechanical Engineering

### CONTACT INFORMATION

- **Administrative Contact**

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### Bio

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#### BIO

Professor Hanson has been an international leader in the development of laser-based diagnostic methods for combustion and propulsion, and in the development of modern shock tube methods for accurate determination of chemical reaction rate parameters needed for modeling combustion and propulsion systems. He and his students have made several pioneering contributions that have impacted the pace of propulsion research and development worldwide. During his career at Stanford, Professor Hanson has successfully managed over 100 research contracts and grants, with a total value well over \$50 million. He and his students have authored over 1200 publications.

Professor Hanson has graduated over 100 Ph.D. candidates and supervised over 20 postdoctoral scholars and research associates. Thirty-two of his students have gone on to become professors including: Varghese, Texas; Louge, Cornell; Kirby, Cornell; Wooldridge, Michigan; Mertens, Trinity College; Song, Yonsei; Rossmann, Lafayette College; Sanders, Wisconsin; Ben-Yakar, Texas; Webber, Texas; Oehlschlaeger, RPI; Ma, Virginia Tech; Koch, Marquette; Lee, Illinois; Rothamer, Wisconsin; Petersen, Texas A&M; Seitzman, Georgia Tech; Linne, Edinburgh; Yoo, SUNY; Porter, Colorado School of Mines; Liu, Washington; Vasu, Central Florida; Ren, Chinese U. of Hong Kong; Rieker, Colorado; Farooq, KAUST; Goldenstein, Purdue; Spearrin, UCLA; Liu, Wuhan; Sun, Tongji; and Chao, Tsinghua. He is currently supervising approximately 15 M.S. and Ph.D. graduate students.

#### ACADEMIC APPOINTMENTS

- Professor, Mechanical Engineering
- Affiliate, Precourt Institute for Energy

#### HONORS AND AWARDS

- Distinguished Lecture Award, Pratt and Whitney (2019)
- Inaugural Fellow, The Combustion Institute (2018)
- Energy Systems Award, American Institute of Aeronautics and Astronautics (2016)
- Hue-Shen Tsien Professorship, China Academy of Science, Inst. of Mechanics (2016)
- David Goodwin Memorial Lecture, California Institute of Technology (2015)
- Milton Van Dyke Award, American Physical Society (2015)

- Honary Professorship, Xi'an Jiaotong University, China (2014)
- Honorary Professorship, Northwestern Polytechnic University, China (2014)
- Arch T. Colwell Award, Society of Automotive Engineers (2013)
- Outstanding Paper of 2013, Journal of Measurement, Science and Technology (2013)
- Most-cited Paper Award, Combustion and Flame (2012)
- Top 20 Most Published Author (Past 50 years), Applied Optics (2012)
- Best Paper in Propellants and Combustion, American Institute of Aeronautics and Astronautics (2011)
- Crocco Lecture, Princeton (2011)
- Fowler Lecture, Texas A&M (2011)
- R.I. Soloukhin Award, Institute for the Dynamics of Explosions and Reactive Systems (2011)
- A. Hottel Memorial Lecture, 33rd International Combustion Symposium (2010)
- Senior Scientist Award, Alexander von Humboldt Foundation (2010)
- Alfred Egerton Gold Medal of the Combustion Institute, Combustion Institute (2008)
- Propellants and Combustion Award, American Institute of Aeronautics and Astronautics (2005)
- Fellow, American Society of Mechanical Engineers (2004)
- Elected to National Academy of Engineering, National Academy of Engineering (2002)
- Silver Medal, Combustion Institute (2002)
- Best Paper of 2000, Journal of Measurement Science and Technology (2000)
- Best Paper Award, Ground Test Conference (AIAA) (1997)
- Fellow, American Institute of Aeronautics and Astronautics (1997)
- Aerodynamic Measurement Technology Award, American Institute of Aeronautics and Astronautics (1996)
- Clarence and Patricia Woodard Professor of Mechanical Engineering, Stanford University (1994)
- Fellow, Optical Society of America (1990)

## **BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS**

- Inaugural Fellow, The Combustion Institute (2018 - present)
- Fellow, American Society of Mechanical Engineers (2004 - present)
- Elected Member, National Academy of Engineering (2002 - present)
- Fellow, American Institute of Aeronautics and Astronautics (1997 - present)
- Fellow, Optical Society of America (1990 - present)

## **PROFESSIONAL EDUCATION**

- M.Sc., Arizona State University , Mechanical Engineering (1965)
- B.S., Oregon State University , Mechanical Engineering (1961)
- Ph.D., Stanford University , Aeronautics and Astronautics (1968)

## **LINKS**

- <http://hanson.stanford.edu/>; <http://hanson.stanford.edu/>

## Research & Scholarship

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### CURRENT RESEARCH AND SCHOLARLY INTERESTS

Professor Hanson has been an international leader in the development of laser-based diagnostic methods for combustion and propulsion, and in the development of modern shock tube methods for accurate determination of chemical reaction rate parameters needed for modeling combustion and propulsion systems. He and his students have made several pioneering contributions that have impacted the pace of propulsion research and development worldwide. During his career at Stanford, Professor Hanson has successfully managed over 100 research contracts and grants, with a total value well over \$50 million. He and his students have authored over 1200 publications.

## Teaching

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### COURSES

#### 2020-21

- Nonequilibrium Processes in High-Temperature Gases: ME 362B (Win)

#### 2019-20

- Optical Diagnostics and Spectroscopy: ME 364 (Win)

#### 2018-19

- High Temperature Gasdynamics Laboratory Research Project Seminar: ME 390A (Aut)
- Nonequilibrium Processes in High-Temperature Gases: ME 362B (Win)
- Optical Diagnostics and Spectroscopy Laboratory: ME 367 (Spr)

#### 2017-18

- Alternative Energy Systems: ME 141 (Spr)
- Optical Diagnostics and Spectroscopy: ME 364 (Win)
- Optical Diagnostics and Spectroscopy Laboratory: ME 367 (Spr)

### STANFORD ADVISEES

#### Doctoral Dissertation Reader (AC)

Yue Zhang

#### Postdoctoral Faculty Sponsor

JK shao

#### Doctoral Dissertation Advisor (AC)

Vivek Boddapati Venkata, Sean Cassady, Daniel Cha, Rishav Choudhary, Sean Clees, Yiming Ding, Alison Ferris, Peter Finch, Julian Girard, Sarah Johnson, Ajay Krish, Nico Pinkowski, Jesse Streicher, Adam Susa, Maneekwan Toyungyernsub, Yu Wang, Luke Zaczek, yang li

#### Master's Program Advisor

Yutian Cai, Joy Franco

#### Doctoral (Program)

Jesse Rodriguez, Jackie Zheng, yang li

## Publications

### PUBLICATIONS

- **Temperature-dependent absorption cross section measurements for propene, 1-butene, cis-/trans-2-butene, isobutene and 1,3-butadiene in the spectral region 8.4-11.7  $\mu\text{m}$**  *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Ding, Y., Su, W., Johnson, S. E., Strand, C. L., Hanson, R. K.  
2020; 255
- **Shock-induced ignition and pyrolysis of high-pressure methane and natural gas mixtures** *COMBUSTION AND FLAME*  
Shao, J., Ferris, A. M., Choudhary, R., Cassady, S. J., Davidson, D. F., Hanson, R. K.  
2020; 221: 364–70
- **A physics-based approach to modeling real-fuel combustion chemistry - VI. Predictive kinetic models of gasoline fuels** *COMBUSTION AND FLAME*  
Xu, R., Saggese, C., Lawson, R., Movaghar, A., Parise, T., Shao, J., Choudhary, R., Park, J., Lu, T., Hanson, R. K., Davidson, D. F., Egolfopoulos, F. N., Aradi, et al  
2020; 220: 475–87
- **Vibrational relaxation time measurements in shock-heated oxygen and air from 2000 K to 9000 K using ultraviolet laser absorption** *PHYSICS OF FLUIDS*  
Streicher, J. W., Krish, A., Hanson, R. K.  
2020; 32 (8)
- **Shock-tube measurements of coupled vibration-dissociation time-histories and rate parameters in oxygen and argon mixtures from 5000 K to 10 000 K** *PHYSICS OF FLUIDS*  
Streicher, J. W., Krish, A., Hanson, R. K., Hanquist, K. M., Chaudhry, R. S., Boyd, I. D.  
2020; 32 (7)
- **The pyrolysis of propane** *INTERNATIONAL JOURNAL OF CHEMICAL KINETICS*  
Cassady, S. J., Choudhary, R., Boddapati, V., Pinkowski, N. H., Davidson, D. F., Hanson, R. K.  
2020
- **Shock tube/laser absorption measurements of the pyrolysis of JP-10 fuel** *COMBUSTION AND FLAME*  
Johnson, S. E., Davidson, D. F., Hanson, R. K.  
2020; 216: 161–73
- **Spectroscopic inference of alkane, alkene, and aromatic formation during high-temperature JP8, JP5, and Jet-A pyrolysis** *FUEL*  
Pinkowski, N. H., Cassady, S. J., Davidson, D. F., Hanson, R. K.  
2020; 269
- **Quantitative measurements of broad-band mid-infrared absorption spectra of formaldehyde, acetaldehyde, and acetone at combustion-relevant temperatures near 5.7  $\mu\text{m}$**  *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Ding, Y., Peng, W. Y., Strand, C. L., Hanson, R. K.  
2020; 248
- **Ultraviolet absorption cross-section measurements of shock-heated O-2 from 2,000-8,400 K using a tunable laser** *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Krish, A., Streicher, J. W., Hanson, R. K.  
2020; 247
- **Two-color frequency-multiplexed IMS technique for gas thermometry at elevated pressures** *APPLIED PHYSICS B-LASERS AND OPTICS*  
Wei, W., Peng, W., Wang, Y., Shao, J., Strand, C. L., Hanson, R. K.  
2020; 126 (3)
- **Collisional broadening and shift of five OH A(2) $\Sigma^+$ -X(2)  $\Pi$  (0-0) transitions in the Q(1)-branch, by H<sub>2</sub>O, O-2, CO<sub>2</sub>, N-2 and Ar, at 1220K** *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Girard, J. J., Clees, S., Hanson, R. K.  
2020; 240
- **Two-temperature Collisional-radiative Modeling of Partially Ionized O<sub>2</sub>-Ar Mixtures over 8000-10,000 K Behind Reflected Shock Waves.** *The journal of physical chemistry. A*

- Li, Y., Wang, S., Strand, C. L., Hanson, R. K.  
2020
- **Determination of the JP10 + OH # Product Reaction Rate with Measured Fuel Concentrations in Shock Tube Experiments.** *The journal of physical chemistry. A*  
Zaczek, L. T., Davidson, D. F., Hanson, R. K.  
2020
  - **The Thermal Decomposition of Ethane** *Fuel*  
Cassady, S. J., Choudhary, R., Pinkowski, N. H., Shao, J., Davidson, D. F., Hanson, R. K.  
2020
  - **Dual-comb Spectroscopy for High-temperature Reaction Kinetics** *Measurement Science and Technology*  
Pinkowski, N. H., Ding, Y., Strand, C. L., Horvath, R., Geiser, M.  
2020
  - **Analysis of laser absorption gas sensors employing scanned-wavelength modulation spectroscopy with 1f-phase detection** *APPLIED PHYSICS B-LASERS AND OPTICS*  
Peng, W., Strand, C. L., Hanson, R. K.  
2020; 126 (1)
  - **R-branch line intensities and temperature-dependent line broadening and shift coefficients of the nitric oxide fundamental rovibrational band** *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Almodovar, C. A., Su, W., Strand, C. L., Hanson, R. K.  
2019; 239
  - **Tunable laser-based detection of benzene using spectrally narrow absorption features** *APPLIED PHYSICS B-LASERS AND OPTICS*  
Sur, R., Ding, Y., Jackson, R. B., Hanson, R. K.  
2019; 125 (11)
  - **Shock Tube Measurement of the CH<sub>3</sub> + C<sub>2</sub>H<sub>6</sub> CH<sub>4</sub> + C<sub>2</sub>H<sub>5</sub> Rate Constant.** *The journal of physical chemistry. A*  
Shao, J., Wei, W., Choudhary, R., Davidson, D. F., Hanson, R. K.  
2019
  - **Experimental Observation of Negative Temperature Dependence in iso-Octane Burning Velocities**  
Susa, A. J., Ferris, A. M., Davidson, D. E., Hanson, R. K.  
AMER INST AERONAUTICS ASTRONAUTICS.2019: 4476–81
  - **Gravity-current-induced test gas stratification and its prevention in constrained reaction volume shock-tube experiments** *SHOCK WAVES*  
Susa, A. J., Davidson, D. F., Hanson, R. K.  
2019; 29 (7): 969–84
  - **High-temperature laminar flame speed measurements in a shock tube** *COMBUSTION AND FLAME*  
Ferris, A. M., Susa, A. J., Davidson, D. F., Hanson, R. K.  
2019; 205: 241–52
  - **High-pressure, high-temperature optical cell for mid-infrared spectroscopy** *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Almodovar, C. A., Su, W., Strand, C. L., Sur, R., Hanson, R. K.  
2019; 231: 69–78
  - **Multi-wavelength speciation of high-temperature 1-butene pyrolysis** *FUEL*  
Pinkowski, N. H., Cassady, S. J., Davidson, D. F., Hanson, R. K.  
2019; 244: 269–81
  - **A shock tube study of n-heptane, iso-octane, n-dodecane and iso-octane/n-dodecane blends oxidation at elevated pressures and intermediate temperatures** *FUEL*  
Shao, J., Choudhary, R., Peng, Y., Davidson, D. F., Hanson, R. K.  
2019; 243: 541–53
  - **Measurement of the reaction rate of H + O<sub>2</sub> + M -> HO<sub>2</sub> + M, for M=Ar, N<sub>2</sub>, CO<sub>2</sub>, at high temperature with a sensitive OH absorption diagnostic** *COMBUSTION AND FLAME*

- Choudhary, R., Girard, J. J., Peng, Y., Shao, J., Davidson, D. F., Hanson, R. K.  
2019; 203: 265–78
- **A new method of estimating derived cetane number for hydrocarbon fuels** *FUEL*  
Wang, Y., Cao, Y., Wei, W., Davidson, D. F., Hanson, R. K.  
2019; 241: 319–26
  - **A two-wavelength ethylene-absorption temperature diagnostic** *MEASUREMENT SCIENCE AND TECHNOLOGY*  
Cassady, S. J., Susa, A. J., Ferris, A. M., Strand, C. L., Hanson, R. K.  
2019; 30 (3)
  - **A multi-wavelength speciation framework for high-temperature hydrocarbon pyrolysis** *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Pinkowski, N. H., Ding, Y., Johnson, S. E., Wang, Y., Parise, T. C., Davidson, D. F., Hanson, R. K.  
2019; 225: 180–205
  - **High-temperature mid-infrared absorption spectra of methanol (CH<sub>3</sub>OH) and ethanol (C<sub>2</sub>H<sub>5</sub>OH) between 930 and 1170 cm<sup>-1</sup>** *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Ding, Y., Strand, C. L., Hanson, R. K.  
2019; 224: 396–402
  - **Quantitative 2-D OH thermometry using spectrally resolved planar laser-induced fluorescence** *OPTICS LETTERS*  
Wang, S., Hanson, R. K.  
2019; 44 (3): 578–81
  - **Shock Tube Measurement of the C<sub>2</sub>H<sub>4</sub> + H double left right arrow C<sub>2</sub>H<sub>3</sub> + H-2 Rate Constant** *JOURNAL OF PHYSICAL CHEMISTRY A*  
Shao, J., Choudhary, R., Peng, Y., Davidson, D. F., Hanson, R. K.  
2019; 123 (1): 15–20
  - **Shock tube study of the rate constants for H + O-2 + M -> HO2 + M (M = Ar, H<sub>2</sub>O, CO<sub>2</sub>, N-2) at elevated pressures** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Shao, J., Choudhary, R., Susa, A., Davidson, D. F., Hanson, R. K.  
2019; 37 (1): 145–52
  - **On estimating physical and chemical properties of hydrocarbon fuels using mid-infrared FTIR spectra and regularized linear models** *Fuel*  
Wang, Y., Ding, Y., Wei, W., Cao, Y., Davidson, D. F., Hanson, R. K.  
2019; 255: 115715
  - **Sensitive and Interference-Immune Formaldehyde Diagnostic for High-Temperature Reacting Gases Using Two-Color Laser Absorption Near 5.6 Microns** *Combustion and Flame*  
Ding, Y., Wang, S., Hanson, R. K.  
2019
  - **High-Temperature Laminar Burning Velocity Experiments in a Shock Tube: LBV, Temperature and Species Measurements** *European Workshop on Flame Speed Measurements*  
Ferris, A. M., Susa, A. J., Girard, J. J., Davidson, D. F., Hanson, R. K.  
2019
  - **Experimental Measurement of Laminar Burning Velocity of n-Heptane at Variable Extents of Reaction in a Shock Tube** *Proc. of the 32nd International Symposium on Shock Waves (ISSW32)*  
Susa, A. J., Ferris, A. M., Davidson, D. F., Hanson, R. K.  
2019
  - **Measurement of the mid-infrared absorption spectra of ethylene (C<sub>2</sub>H<sub>4</sub>) and other molecules at high temperatures and pressures** *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Strand, C. L., Ding, Y., Johnson, S. E., Hanson, R. K.  
2019; 222: 122–29
  - **Shock Tube/Laser Absorption Measurements of the Pyrolysis of JP-10 Fuel** *AIAA SciTech Forum*  
Johnson, S. E., Davidson, D. F., Hanson, R. K.  
2019

- **Multi-wavelength speciation of high-temperature alternative and conventional jet fuel pyrolysis** *AIAA SciTech Forum*  
Pinkowski, N. H., Davidson, D. F., Hanson, R. K.  
2019
- **Experimental Shock Tube Measurements of Laminar Burning Velocity of n-Heptane and iso-Octane in the Negative Temperature Coefficient Regime** *AIAA SciTech Forum*  
Susa, A. J., Ferris, A. M., Davidson, D. F., Hanson, R. K.  
2019
- **Shock tube techniques for kinetic target data to improve reaction models** *Mathematical Modelling of Gas-Phase Complex Reaction Systems: Pyrolysis and Combustion, Volume 45*  
Wang, S., Davidson, D. F., Hanson, R. K.  
Elsevier.2019
- **Dual-comb Spectroscopy in Shock tubes: Mid-infrared Microsecond-resolved Spectrometer** *11th Int. Conf. on Chemical Kinetics*  
Hugi, A., Geiser, M., Horvath, R., Strand, C. L., Pinkowski, N. H., Ding, Y., Hanson, R. K.  
2019
- **Spectroscopic Applications of Quantum Cascade Laser Frequency Combs** *International Conference on Advanced Vibrational Spectroscopy*  
Horvath, R., Mangold, M., Strand, C. L., Pinkowski, N. H., Ding, Y., Hanson, R. K.  
2019
- **n-Heptane Ignition: High-Speed Imaging in a High-Pressure Shock Tube** *Proceedings of the 27th International Colloquium on the Dynamics of Explosions and Reactive Systems*  
Shao, J., Choudhary, R., Susa, A. J., Davidson, D. F., Hanson, R. K.  
2019
- **Measurements of Laminar Burning Velocity in a Shock Tube** *Proceedings of the 27th International Colloquium on the Dynamics of Explosions and Reactive Systems*  
Susa, A. J., Ferris, A. M., Davidson, D. F., Hanson, R. K.  
2019
- **Multi-species time history measurements during ethanol pyrolysis behind reflected shock waves** *11th U. S. National Combustion Meeting*  
Choudhary, R., Peng, Y., Shao, J., Davidson, D. F.  
2019
- **Time-resolved Speciation of iso-Octane First-stage Ignition Products at Elevated Effective Pressures** *11th U. S. National Combustion Meeting*  
Susa, A. J., Davidson, D. F., Hanson, R. K.  
2019
- **Temperature, Species, and Laminar flame Speed Measurements in High-temperature, Premixed Ethane-Air Flames** *11th U. S. National Combustion Meeting*  
Ferris, A. M., Girard, J. J., Susa, A. J., Davidson, D. F., Hanson, R. K.  
2019
- **Information-driven Experiment Design for Shock Tube Kinetic Studies** *11th U. S. National Combustion Meeting*  
Wang, S., Davidson, D. F., Hanson, R. K.  
2019
- **Dual-comb Spectroscopy in Shock Tubes: Mid-Infrared Microsecond-resolved Spectrometer** *Proc. of the 32nd International Symposium on Shock Waves (ISSW32)*  
Geiser, M., Horvath, R., Strand, C. L., Pinkowski, N. H., Ding, Y., Hanson, R. K.  
2019
- **Dual-comb Measurements behind Reflected Shock Waves** *Proc. of the 32nd International Symposium on Shock Waves (ISSW32)*  
Pinkowski, N. H., Strand, C. L., Ding, Y., Hanson, R. K., Horvath, R., Geiser, M.  
2019
- **TDLAS Measurements of the Underexpanded Exhaust Plume from a Solid Propellant Gas Generator** *AIAA SciTech Forum*  
Almodovar, C. A., Salazar, D. V., Strand, C. L., Hanson, R. K., Wright, R. G., Brophy, C. M.

2019

- **Measurements of Oxygen Vibrational Relaxation and Dissociation using Ultraviolet Laser Absorption in Shock Tube Experiments** *AIAA SciTech Forum*  
Streicher, J. W., Krish, A., Wang, S., Davidson, D. F., Hanson, R. K.  
2019
- **High-speed Imaging of Homogeneous and Inhomogeneous Ignition in a High-pressure Shock Tube** *AIAA SciTech Forum*  
Shao, J., Choudhary, R., Susa, A. J., Peng, Y., Davidson, D. F., Hanson, R. K.  
2019
- **Spectrally-resolved Absorption and Laser-induced Fluorescence of High-temperature Gases** *AIAA SciTech Forum*  
Wang, S., Strand, C. L., Hanson, R. K.  
2019
- **Direct Measurement of the JP-10+OH=Products Reaction Rate in Shock Tube Experiments** *AIAA SciTech Forum*  
Zaczek, L. T., Hanson, R. K.  
2019
- **A Single-ended, Mid-IR Sensor for Time-resolved Temperature and Species Measurements in a Hydrogen/Ethylene-fueled Rotating Detonation Engine** *AIAA SciTech Forum*  
Cassady, S. J., Peng, W. Y., Strand, C. L., Jeffries, J. B., Hanson, R. K., Dausen, D. F., Brophy, C. M.  
2019
- **Ignition Delay Time Measurements for Distillate and synthetic Jet Fuels** *AIAA SciTech Forum*  
Wang, Y., Cao, Y., Davidson, D. F., Hanson, R. K.  
2019
- **Demonstration of non-absorbing interference rejection using wavelength modulation spectroscopy in high-pressure shock tubes** *APPLIED PHYSICS B-LASERS AND OPTICS*  
Wei, W., Peng, W., Wang, Y., Choudhary, R., Wang, S., Shao, J., Hanson, R. K.  
2019; 125 (1)
- **Single-ended mid-infrared laser-absorption sensor for time-resolved measurements of water concentration and temperature within the annulus of a rotating detonation engine** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Peng, W., Cassady, S. J., Strand, C. L., Goldenstein, C. S., Spearrin, R., Brophy, C. M., Jeffries, J. B., Hanson, R. K.  
2019; 37 (2): 1435–43
- **Ignition delay times of methane and hydrogen highly diluted in carbon dioxide at high pressures up to 300 atm** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Shao, J., Choudhary, R., Davidson, D. E., Hanson, R. K., Barak, S., Vasu, S.  
2019; 37 (4): 4555–62
- **Ignition delay time measurements and modeling for gasoline at very high pressures** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Davidson, D. F., Shao, J. K., Choudhary, R., Mehl, M., Obrecht, N., Hanson, R. K.  
2019; 37 (4): 4885–92
- **Cavity-enhanced absorption spectroscopy for shocktubes: Design and optimization** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Chao, X., Shen, G., Sun, K., Wang, Z., Meng, Q., Wang, S., Hanson, R. K.  
2019; 37 (2): 1345–53
- **A streamlined approach to hybrid-chemistry modeling for a low cetane-number alternative jet fuel** *Combustion and Flame*  
Pinkowski, N. H., Wang, Y., Cassady, S. J., Davidson, D. F., Hanson, R. K.  
2019; 208: 15-26
- **Single-Ended Sensor for Thermometry and Speciation in Shock Tubes Using Native Surfaces** *IEEE Sensors Journal*  
Peng, W. Y., Wang, Y., Cassady, S. J., Strand, C. L., Hanson, R. K.  
2019
- **A comparative laser absorption and gas chromatography study of low-temperature n-heptane oxidation intermediates** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Ferris, A. M., Susa, A. J., Davidson, D. F., Hanson, R. K.



2019; 37 (1): 249–57

- **Shock tube measurements of OH concentration time-histories in benzene, toluene, ethylbenzene and xylene oxidation** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Wang, S., Davidson, D. F., Hanson, R. K.  
2019; 37 (1): 163–70
- **Temperature-dependent line parameter study of acetylene transitions near 3  $\mu$  m** *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Cassady, S. J., Peng, W., Hanson, R. K.  
2018; 221: 172–82
- **Collisional-induced broadening and shift parameters of OH with Ar and N<sub>2</sub> near 308.6 nm, measured at T=1300-2000 K and P=20-100 atm** *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Girard, J. J., Choudhary, R., Hanson, R. K.  
2018; 221: 194–201
- **Shock tube study of normal heptane first-stage ignition near 3.5 atm** *COMBUSTION AND FLAME*  
Campbell, M. F., Wang, S., Davidson, D. F., Hanson, R. K.  
2018; 198: 376–92
- **A physics based approach to modeling real-fuel combustion chemistry - IV. HyChem modeling of combustion kinetics of a bio-derived jet fuel and its blends with a conventional Jet A** *COMBUSTION AND FLAME*  
Wang, K., Xu, R., Parise, T., Shao, J., Movaghar, A., Lee, D., Park, J., Gao, Y., Lu, T., Egolfopoulos, F. N., Davidson, D. F., Hanson, R. K., Bowman, et al  
2018; 198: 477–89
- **A Physics-based approach to modeling real-fuel combustion chemistry - III. Reaction kinetic model of JP10** *COMBUSTION AND FLAME*  
Tao, Y., Xu, R., Wang, K., Shao, J., Johnson, S. E., Movaghar, A., Han, X., Park, J., Lu, T., Brezinsky, K., Egolfopoulos, F. N., Davidson, D. F., Hanson, et al  
2018; 198: 466–76
- **High-speed imaging of inhomogeneous ignition in a shock tube**  
Tulgestke, A. M., Johnson, S. E., Davidson, D. F., Hanson, R. K.  
SPRINGER.2018: 1089–95
- **A combined laser absorption and gas chromatography sampling diagnostic for speciation in a shock tube** *COMBUSTION AND FLAME*  
Ferris, A. M., Davidson, D. E., Hanson, R. K.  
2018; 195: 40–49
- **A shock tube study of jet fuel pyrolysis and ignition at elevated pressures and temperatures** *FUEL*  
Shao, J., Zhu, Y., Wang, S., Davidson, D. F., Hanson, R. K.  
2018; 226: 338–44
- **A shock tube study of ignition delay times in diluted methane, ethylene, propene and their blends at elevated pressures** *FUEL*  
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  - **Mid-infrared laser-absorption diagnostic for vapor-phase fuel mole fraction and liquid fuel film thickness** *APPLIED PHYSICS B-LASERS AND OPTICS*  
Porter, J. M., Jeffries, J. B., Hanson, R. K.  
2011; 102 (2): 345-355
  - **Interference-free mid-IR laser absorption detection of methane** *MEASUREMENT SCIENCE & TECHNOLOGY*  
Pyun, S. H., Cho, J., Davidson, D. F., Hanson, R. K.  
2011; 22 (2)
  - **A new shock tube study of the H + O-2 -> OH plus O reaction rate using tunable diode laser absorption of H<sub>2</sub>O near 2.5 μm** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Hong, Z., Davidson, D. F., Barbour, E. A., Hanson, R. K.  
2011; 33: 309-316
  - **Fuel and Ethylene Measurements during n-Dodecane, Methylcyclohexane, and iso-Cetane Decomposition in Shock Tubes** *47th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit*  
MacDonald, M. E., Ren, W., Davidson, D. F., Hanson, R. K.  
2011
  - **Tunable Diode Laser Absorption Sensor for Measurements of Temperature and Water Concentration in Supersonic Flows** *49th AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition*  
Goldenstein, C. S., Schultz, I. A., Jeffries, J. B., Hanson, R. K.  
2011

- **Supersonic Mass Flux Measurements via Tunable Diode Laser Absorption and Non-Uniform Flow Modeling** *49th AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition*  
Chang, L. S., Strand, C. L., Jeffries, J. B., Hanson, R. K., Diskin, G. S., Gaffney, R. L., Capriotti, D. P.  
2011
- **Toluene Laser-induced Fluorescence Imaging of Compressible Flows in an Expansion Tube** *64th Annual Meeting of the APS Division of Fluid Dynamics*  
Miller, V. A., Gamba, M., Mungal, M. G., Hanson, R. K., Mohri, K., Schulz, C.  
2011
- **Thermometry and Velocimetry in Supersonic Flows via Scanned Wavelength-Modulation Absorption Spectroscopy** *47th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit*  
Strand, C. L., Hanson, R. K.  
2011
- **RP-Fuel and Surrogate Pyrolysis: Multi-species Time-history Measurements using Shock Tube/Laser Absorption** *JANNAF Meeting*  
Davidson, D. F., MacDonald, M. E., Hanson, R. K.  
2011
- **MMH Pyrolysis and Oxidation: Species Time-History Measurements behind Reflected Shock Waves** *23rd ICDERS*  
Cook, R. D., Davidson, D. F., Pyun, S. H., Hanson, R. K.  
2011
- **Development of a Model Scramjet Combustor** *49th AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition*  
Miller, V. A., Gamba, M., Mungal, M. G., Hanson, R. K.  
2011
- **Temperature Measurements in an Entrained Flow, Slagging, Coal Gasifier using Laser Absorption of Water Vapor** *28th Annual International Pittsburgh Coal Conference*  
Sun, K., Sur, R., Chao, X., Jeffries, J. B., Hanson, R. K., Pummill, R. J., Wagner, D. A., Whitty, K. J., Steele, R. C.  
2011
- **Temperature Time-history Measurements in a Shock Tube using Diode Laser Absorption of CO<sub>2</sub> near 2.7 μm** *23rd ICDERS*  
Ren, W., Li, S., Davidson, D. F., Hanson, R. K.  
2011
- **Shock Tube Measurements of Ethylene Concentration Time-histories during Ethylene, n-Heptane and methylocyclohexane Pyrolysis** *7th U.S. National Combustion Meeting*  
Ren, W., Davidson, D. F., Hanson, R. K.  
2011
- **Ignition and Near-Wall Burning in Transverse Hydrogen Jets in Supersonic Crossflow** *49th AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition*  
Gamba, M., Mungal, M. G., Hanson, R. K.  
2011
- **Shock Tube Measurements of Ignition Delay Times and OH and H<sub>2</sub>O Species Time-histories in 3-pentanone/O<sub>2</sub>/Ar Mixtures** *7th International Conference on Chemical Kinetics*  
Lam, K. Y., Hong, Z., Durrstein, S. W., Davidson, D. F., Hanson, R. K., Schulz, C.  
2011
- **Ignition and Flame Structure in a Compact Inlet/Scramjet Combustor** *17th AIAA International Space Planes and Hypersonic Systems and Technologies Conference*  
Miller, V. A., Mungal, M. G., Hanson, R. K.  
2011
- **High-temperature Reactions of OH with Linear Alkenes up to C<sub>4</sub>** *7th International Conference on Chemical Kinetics*  
Harper, M. R., Green, W. H., Van Geem, K. M., Weber, B. W., Sung, C., Stranic, I., Davidson, D. F., Hanson, R. K.  
2011
- **Combustion of the Butanol Isomers: Reaction Pathways at Elevated Pressures from Low to High Temperatures** *7th International Conference on Chemical Kinetics*



Harper, M. R., Green, W. H., Van Geem, K. M., Weber, B. W., Hanson, R. K.  
2011

- **Shock Tube/Laser Absorption Measurements of JP-8 Ignition Delay Times and Multi-species Time-histories** *JANNAF Meeting*  
Davidson, D. F., Li, S., Lam, K. Y., Stranic, I., Hanson, R. K.  
2011
- **Multi-Species Measurements of n-Butanol Pyrolysis behind Reflected Shock Waves** *7th International Conference on Chemical Kinetics*  
Cook, R. D., Sur, R., Stranic, I., Davidson, D. F., Hanson, R. K., Harper, M. R., Green, W. H.  
2011
- **Tunable Diode Laser Absorption Diagnostic for Scramjet Combustion Flows** *7th U.S. National Combustion Meeting*  
Schultz, I. A., Goldenstein, C. S., Jeffries, J. B., Hanson, R. K.  
2011
- **Shock Tube/Laser Absorption Database for the Oxidation of Hi Fire JP-7 Surrogate Fuel** *JANNAF Meeting*  
Davidson, D. F., Hanson, R. K., Ren, W.  
2011
- **Ignition and Flame Structure in a Compact Inlet/Scramjet Combustor Model** *17th AIAA International Space Planes and Hypersonic Systems and Technologies Conference*  
Gamba, M., Miller, V. A., Mungal, M. G., Hanson, R. K.  
2011
- **Shock tube/laser absorption measurements of ethylene time-histories during ethylene and n-heptane pyrolysis** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Pilla, G. L., Davidson, D. F., Hanson, R. K.  
2011; 33: 333-340
- **Applications of quantitative laser sensors to kinetics, propulsion and practical energy systems** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Hanson, R. K.  
2011; 33: 1-40
- **Response of Bacillus thuringiensis Al Hakam Endospores to Gas Dynamic Heating in a Shock Tube** *ZEITSCHRIFT FUR PHYSIKALISCHE CHEMIE-INTERNATIONAL JOURNAL OF RESEARCH IN PHYSICAL CHEMISTRY & CHEMICAL PHYSICS*  
McCart, A. D., Gates, S. D., Jeffries, J. B., Hanson, R. K., Joubert, L. M., Buhr, T. L.  
2011; 225 (11-12): 1367-1377
- **Multi-species time-history measurements during n-dodecane oxidation behind reflected shock waves** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Davidson, D. F., Hong, Z., Pilla, G. L., Farooq, A., Cook, R. D., Hanson, R. K.  
2011; 33: 151-157
- **Shock tube ignition delay time measurements in propane/O-2/argon mixtures at near-constant-volume conditions** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Lam, K., Hong, Z., Davidson, D. F., Hanson, R. K.  
2011; 33: 251-258
- **OH and C2H4 species time-histories during hexadecane and diesel ignition behind reflected shock waves** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Haylett, D. R., Cook, R. D., Davidson, D. F., Hanson, R. K.  
2011; 33: 167-173
- **High-Temperature Measurements of the Rate Constants for Reactions of OH with a Series of Large Normal Alkanes: n-Pentane, n-Heptane, and n-Nonane** *ZEITSCHRIFT FUR PHYSIKALISCHE CHEMIE-INTERNATIONAL JOURNAL OF RESEARCH IN PHYSICAL CHEMISTRY & CHEMICAL PHYSICS*  
Pang, G. A., Hanson, R. K., Golden, D. M., Bowman, C. T.  
2011; 225 (11-12): 1157-1178
- **In situ absorption sensor for NO in combustion gases with a 5.2  $\mu$ m quantum-cascade laser** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Chao, X., Jeffries, J. B., Hanson, R. K.  
2011; 33: 725-733

- **Temperature and pressure imaging using infrared planar laser-induced fluorescence** *APPLIED OPTICS*  
Rothamer, D. A., Hanson, R. K.  
2010; 49 (33): 6436-6447
- **Shock Tube/Laser Absorption Measurements of the Reaction Rates of OH with Ethylene and Propene** *JOURNAL OF PHYSICAL CHEMISTRY A*  
Vasu, S. S., Hong, Z., Davidson, D. F., Hanson, R. K., Golden, D. M.  
2010; 114 (43): 11529-11537
- **Bacillus endospore resistance to gas dynamic heating** *JOURNAL OF APPLIED MICROBIOLOGY*  
Gates, S. D., McCartt, A. D., Lappas, P., Jeffries, J. B., Hanson, R. K., Hokama, L. A., Mortelmans, K. E.  
2010; 109 (5): 1591-1598
- **Mass Flux Sensing via Tunable Diode Laser Absorption of Water Vapor** *48th AIAA Aerospace Sciences Meeting and Exhibit Including the New Horizons Forum and Aerospace Exposition*  
Chang, L. S., Jeffries, J. B., Hanson, R. K.  
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- **Multi-species time-history measurements during n-heptane oxidation behind reflected shock waves** *COMBUSTION AND FLAME*  
Davidson, D. F., Hong, Z., Pilla, G. L., Farooq, A., Cook, R. D., Hanson, R. K.  
2010; 157 (10): 1899-1905
- **Temperature sensing in shock-heated evaporating aerosol using wavelength-modulation absorption spectroscopy of CO<sub>2</sub> near 2.7  $\mu$  m** *MEASUREMENT SCIENCE & TECHNOLOGY*  
Ren, W., Jeffries, J. B., Hanson, R. K.  
2010; 21 (10)
- **Planar laser-induced fluorescence imaging in shock tube flows** *EXPERIMENTS IN FLUIDS*  
Yoo, J., Mitchell, D., Davidson, D. F., Hanson, R. K.  
2010; 49 (4): 751-759
- **Measurements of the reaction of OH with n-butanol at high-temperatures** *CHEMICAL PHYSICS LETTERS*  
Vasu, S. S., Davidson, D. F., Hanson, R. K., Golden, D. M.  
2010; 497 (1-3): 26-29
- **High-Temperature Measurements and a Theoretical Study of the Reaction of OH with 1,3-Butadiene** *JOURNAL OF PHYSICAL CHEMISTRY A*  
Vasu, S. S., Zador, J., Davidson, D. F., Hanson, R. K., Golden, D. M., Miller, J. A.  
2010; 114 (32): 8312-8318
- **Shock-Tube Experiments and Kinetic Modeling of Toluene Ignition** *JOURNAL OF PROPULSION AND POWER*  
Vasu, S. S., Davidson, D. F., Hanson, R. K.  
2010; 26 (4): 776-783
- **A Shock Tube Study of OH + H<sub>2</sub>O<sub>2</sub> -> H<sub>2</sub>O + HO<sub>2</sub> and H<sub>2</sub>O<sub>2</sub> + M -> 2OH+M using Laser Absorption of H<sub>2</sub>O and OH** *JOURNAL OF PHYSICAL CHEMISTRY A*  
Hong, Z., Cook, R. D., Davidson, D. F., Hanson, R. K.  
2010; 114 (18): 5718-5727
- **Experimental Study of the Rate of OH + HO<sub>2</sub> -> H<sub>2</sub>O + O<sub>2</sub> at High Temperatures Using the Reverse Reaction** *JOURNAL OF PHYSICAL CHEMISTRY A*  
Hong, Z., Vasu, S. S., Davidson, D. F., Hanson, R. K.  
2010; 114 (17): 5520-5525
- **High-pressure measurements of CO<sub>2</sub> absorption near 2.7  $\mu$  m: Line mixing and finite duration collision effects** *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Farooq, A., Jeffries, J. B., Hanson, R. K.  
2010; 111 (7-8): 949-960
- **Optimization of a tracer-based PLIF diagnostic for simultaneous imaging of EGR and temperature in IC engines** *APPLIED PHYSICS B-LASERS AND OPTICS*  
Rothamer, D. A., Snyder, J. A., Hanson, R. K., Steeper, R. R.  
2010; 99 (1-2): 371-384

- **Ignition Delay Time Measurements of Normal Alkanes and Simple Oxygenates** *JOURNAL OF PROPULSION AND POWER*  
Davidson, D. F., Ranganath, S. C., Lam, K., Liaw, M., Hong, Z., Hanson, R. K.  
2010; 26 (2): 280-287
- **Chemical Nonequilibrium, Heat Transfer, and Friction in a Detonation Tube with Nozzles** *JOURNAL OF PROPULSION AND POWER*  
Barbour, E. A., Hanson, R. K.  
2010; 26 (2): 230-239
- **CW laser-induced fluorescence of toluene for time-resolved imaging of gaseous flows** *APPLIED PHYSICS B-LASERS AND OPTICS*  
Cheung, B. H., Hanson, R. K.  
2010; 98 (2-3): 581-591
- **The Influence of Wall Heat Transfer, Friction, and Condensation on Detonation Tube Performance** *COMBUSTION SCIENCE AND TECHNOLOGY*  
Owens, Z. C., Hanson, R. K.  
2010; 182 (8): 1104-1140
- **Mass Flux Sensing via Tunable Diode Laser Absorption of Water Vapor** *48th AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition*  
Chang, L. S., Jeffries, J. B., Hanson, R. K.  
2010
- **Mult-Species Measurements Behind Reflected Shock Waves in Hydrocarbons Using Laser Absorption** *48th AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition*  
Davidson, D. F., Pilla, G., Farooq, A., Cook, R., Hong, Z., Hanson, R. K.  
2010
- **Crank-angle-resolved Measurements of Air-Fuel Ratio, Temperature and Liquid Fuel Droplet Scattering in a Direct-injection Gasoline Engine** *SAE Powertrains Fuels & Lubricants Meeting*  
Sholes, K. R., Shouji, K., Chaya, T., Jeffries, J. B., Porter, J. M., Pyun, S. P., Hanson, R. K.,  
2010
- **A Second-Generation Aerosol Shock Tube for Combustion Research** *48th AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition*  
Haylett, D. R., Davidson, D. F., Hanson, R. K.  
2010
- **Tunable Diode Laser Absorption Sensor of Temperature and Water Concentration in Supersonic Flows** *49th AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition*  
Goldenstein, C. S., Schultz, I. A., Jeffries, J. B., Hanson, R. K.  
2010
- **PLIF Measurements of Thermal Stratification in a HCCI Engine under Fired Operation** *SAE World Congress*  
Snyder, J. A., Hanson, R. K., Dronniou, N., Dec, J. E.  
2010: 1669-88
- **Shock Tube Laser Absorption Studies of the Decomposition of Fuel Surrogates** *JANNAF Joint Propulsion Meeting*  
Davidson, D. F., Pilla, G., MacDonald, M. E., Hanson, R. K.  
2010
- **Laser Diagnostic Techniques for Shock Tube Studies of Combustion Chemistry** *Laser Applications to Chemical, Security and Environmental Analysis*  
Hanson, R. K.  
2010
- **Determination of Cycle Temperatures and Residual Gas Fraction for HCCI Negative Valve Overlap Operation** *SAE International Journal of Engines*  
Fitzgerald, R. P., Steeper, R., Snyder, J., Hanson, R. K., Hessel, R.  
2010; 3 (1): 124-141
- **Multi-Species Measurements Behind Reflected Shock Waves in Hydrocarbons using Laser Absorption** *48th AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition*  
Davidson, D. F., Pilla, G. L., Farooq, A., Cook, R. D., Hong, Z., Hanson, R. K.

2010

- **An In-cylinder Laser Absorption Sensor for Crank-angle-resolved Measurements of Gasoline , Concentration and Temperature** *SAE Powertrains, Fuels and Lubricants*  
Jeffries, J. B., Porter, J. M., Pyun, S. H., Hanson, R. K., Sholes, K. R., Shouji, K., Chaya, T.  
2010: 373–82
- **Measurements of CO<sub>2</sub> concentration and temperature at high pressures using 1f-normalized wavelength modulation spectroscopy with second harmonic detection near 2.7  $\mu$  m** *APPLIED OPTICS*  
Farooq, A., Jeffries, J. B., Hanson, R. K.  
2009; 48 (35): 6740-6753
- **Mid-infrared absorption measurements of liquid hydrocarbon fuels near 3.4  $\mu$  m** *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Porter, J. M., Jeffries, J. B., Hanson, R. K.  
2009; 110 (18): 2135-2147
- **Two-color-absorption sensor for time-resolved measurements of gasoline concentration and temperature** *APPLIED OPTICS*  
Pyun, S. H., Porter, J. M., Jeffries, J. B., Hanson, R. K., Montoya, J. C., Allen, M. G., Sholes, K. R.  
2009; 48 (33): 6492-6500
- **Hydrogen Peroxide Decomposition Rate: A Shock Tube Study Using Tunable Laser Absorption of H<sub>2</sub>O near 2.5  $\mu$  m** *JOURNAL OF PHYSICAL CHEMISTRY A*  
Hong, Z., Farooq, A., Barbour, E. A., Davidson, D. F., Hanson, R. K.  
2009; 113 (46): 12919-12925
- **Absorption sensor for CO in combustion gases using 2.3  $\mu$  m tunable diode lasers** *6th International Symposium on Measurement Techniques for Multiphase Flows*  
Chao, X., Jeffries, J. B., Hanson, R. K.  
IOP PUBLISHING LTD.2009
- **Calibration-free wavelength-modulation spectroscopy for measurements of gas temperature and concentration in harsh environments** *APPLIED OPTICS*  
Rieker, G. B., Jeffries, J. B., Hanson, R. K.  
2009; 48 (29): 5546-5560
- **The effect of oxygenates on soot formation in rich heptane mixtures: A shock tube study** *FUEL*  
Hong, Z., Davidson, D. F., VASU, S. S., Hanson, R. K.  
2009; 88 (10): 1901-1906
- **High-Temperature Shock Tube Measurements of Dimethyl Ether Decomposition and the Reaction of Dimethyl Ether with OH** *JOURNAL OF PHYSICAL CHEMISTRY A*  
Cook, R. D., Davidson, D. F., Hanson, R. K.  
2009; 113 (37): 9974-9980
- **Mid-infrared laser-absorption diagnostic for vapor-phase measurements in an evaporating n-decane aerosol** *APPLIED PHYSICS B-LASERS AND OPTICS*  
Porter, J. M., Jeffries, J. B., Hanson, R. K.  
2009; 97 (1): 215-225
- **Recent advances in shock tube/laser diagnostic methods for improved chemical kinetics measurements** *SHOCK WAVES*  
Davidson, D. F., Hanson, R. K.  
2009; 19 (4): 271-283
- **Contact surface tailoring condition for shock tubes with different driver and driven section diameters** *SHOCK WAVES*  
Hong, Z., Davidson, D. F., Hanson, R. K.  
2009; 19 (4): 331-336
- **Sensitive detection of temperature behind reflected shock waves using wavelength modulation spectroscopy of CO<sub>2</sub> near 2.7  $\mu$  m** *APPLIED PHYSICS B-LASERS AND OPTICS*  
Farooq, A., Jeffries, J. B., Hanson, R. K.  
2009; 96 (1): 161-173

- **The use of driver inserts to reduce non-ideal pressure variations behind reflected shock waves** *SHOCK WAVES*  
Hong, Z., Pang, G. A., Vasu, S. S., Davidson, D. F., Hanson, R. K.  
2009; 19 (2): 113-123
- **OH time-histories during oxidation of n-heptane and methylcyclohexane at high pressures and temperatures** *COMBUSTION AND FLAME*  
Vasu, S. S., Davidson, D. F., Hanson, R. K.  
2009; 156 (4): 736-749
- **Jet fuel ignition delay times: Shock tube experiments over wide conditions and surrogate model predictions (vol 152, pg 125, 2008)** *COMBUSTION AND FLAME*  
Vasu, S. S., Davidson, D. F., Hanson, R. K.  
2009; 156 (4): 946-946
- **Simultaneous imaging of exhaust gas residuals and temperature during HCCI combustion** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Rothamer, D. A., Snyder, J. A., Hanson, R. K., Steeper, R. R., Fitzgerald, R. P.  
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Li, H., Farooq, A., Cook, R. D., Davidson, D. F., Jeffries, J. B., Hanson, R. K.  
SPRINGER-VERLAG BERLIN.2009: 409-414
- **Measurements of ignition delay times and OH species concentrations in DME/O-2/Ar mixtures** *26th International Symposium on Shock Waves*  
Cook, R. D., Davidson, D. F., Hanson, R. K.  
SPRINGER-VERLAG BERLIN.2009: 763-767
- **High-pressure shock tube experiments and modeling of n-dodecane/air ignition** *26th International Symposium on Shock Waves*  
VASU, S. S., Davidson, D. F., Hanson, R. K.  
SPRINGER-VERLAG BERLIN.2009: 293-298
- **Tunable Diode Laser Sensing of NO near 5.2  $\mu\text{m}$  and CO near 2.3  $\mu\text{m}$  in Combustion Exhaust Gases** *6th U.S. National Meeting on Combustion*  
Jeffries, J. B., Hanson, R. K.  
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- **Rate Measurements of DME Decomposition and DME + OH at Elevated Temperatures** *6th U.S. National Combustion Meeting*  
Cook, R. D., Davidson, D. F., Hanson, R. K.  
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- **Measurements of Ignition Delay Times and OH Species Concentrations in DME/O<sub>2</sub>/AR Mixtures** *26th International Symposium on Shock Waves*  
Cook, R. D., Davidson, D. F., Hanson, R. K.  
2009
- **Boundary Layer Entrainment and Combustion in a Transverse Jet in Supersonic Crossflow** *62nd Annual Meeting of the APS Division of Fluid Dynamics*  
Heltsley, W. N., Gamba, M., Mungal, M. G., Hanson, R. K.  
2009
- **Mixing and Reaction of Jets in Supersonic Crossflows** *12th EUROMECH European Turbulence Conference*  
Heltsley, W. N., Do, H., Snyder, J. A., Mungal, M. G., Hanson, R. K.  
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- **Control of Instabilities in a Swirl-Stabilized Flame with a Tunable Diode Laser Temperature Sensor** *Nihon Nensho Gakkaishi (J. of Combustion Society of Japan)*  
Li, H., Jeffries, J. B., Hanson, R. K.  
2009; 50 (154): 289-296
- **Tunable Diode Laser Sensing in Harsh Environments: Applications to Propulsion and Combustion** *invited plenary at 6th U.S. National Meeting on Combustion*  
Hanson, R. K.  
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- **Dual-wavelength PLIF Measurements of Temperature and Composition in an Optical Engine with Negative Valve Overlaps** *SAE World Congress & Exhibition*

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- **Tunable Diode Laser Absorption Measurements in a Fluidized-Bed Gasifier** *26th International Pittsburgh Coal Conference*  
Jeffries, J. B., Fahrland, A., Min, W., Hanson, R. K., Sweeney, D., Wagner, D., Whitty, K. J.  
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  - **Ex Situ Analysis of Shock Wave Induced Damage to Bacillus Globigii (GB) Endospores** *poster at 2009 Chem. & Biol. Defense Science & Tech. Conf.*  
Gates, S. D., McCart, A. D., Lappas, P., Jeffries, J. B., Hanson, R. K., Hokama, L. A., Mortelmans, K. E.  
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  - **In Situ Measurements of Shock Wave Interactions with Endospore-laden Aerosol** *poster at 2009 Chem. & Biol. Defense Science & Tech. Conf.*  
McCart, A. D., Gates, S. D., Lappas, P., Jeffries, J. B., Hanson, R. K.,  
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  - **Near-wall Combustion Zones of a Transverse Jet in Supersonic Crossflow** *poster at 2009 DFD meeting of APS*  
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  - **Some Aspects of Toluene Ignition: Experiments and Modeling** *6th U.S. National Combustion Meeting*  
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  - **Simultaneous Measurement of Flow Fluctuations and Near-Field Pressure in a Subsonic Jet** *15th AIAA/CEAS Aeroacoustics Conference (30th AIAA Aeroacoustics Conference)*  
Kastner, J., Cuppoletti, D., Gutmark, E., Fahrland, A., Jeffries, J. B., Hanson, R. K.,  
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  - **Species Time-History Measurements During n-Heptane Oxidation behind Reflected Shock Waves** *6th U.S. National Combustion Meeting*  
Davidson, D. F., Hong, Z., Pilla, G. L., Farooq, A., Cook, R. D., Hanson, R. K.,  
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  - **Analytic Model for Single-Cycle Detonation Tube with Diverging Nozzles** *JOURNAL OF PROPULSION AND POWER*  
Barbour, E. A., Hanson, R. K.  
2009; 25 (1): 162-172
  - **Measurements of high-pressure CO<sub>2</sub> absorption near 2.0  $\mu$  m and implications on tunable diode laser sensor design** *APPLIED PHYSICS B-LASERS AND OPTICS*  
Rieker, G. B., Jeffries, J. B., Hanson, R. K.  
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  - **Two-wavelength mid-IR absorption diagnostic for simultaneous measurement of temperature and hydrocarbon fuel concentration** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
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  - **Experimental study and modeling of shock tube ignition delay times for hydrogen-oxygen-argon mixtures at low temperatures** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
Pang, G. A., Davidson, D. F., Hanson, R. K.  
2009; 32: 181-188
  - **Diode laser-based detection of combustor instabilities with application to a scramjet engine** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*  
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