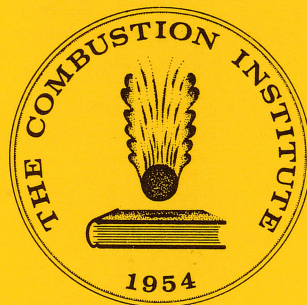


CHEMICAL AND PHYSICAL PROCESSES IN COMBUSTION

**Eastern Section of
The Combustion Institute**



**1978 FALL
TECHNICAL MEETING**

**November 29, 30
December 1, 1978**

Miami Beach, Florida

**EASTERN SECTION OF THE COMBUSTION INSTITUTE
1978 FALL TECHNICAL MEETING
NOVEMBER 29, 30 AND DECEMBER 1, 1978, EDEN ROC HOTEL, MIAMI BEACH, FLORIDA
CHEMICAL AND PHYSICAL PROCESSES IN COMBUSTION**

Wednesday, November 29, 1978

7:30 a.m. — Registration

8:20 a.m. — Welcome and Introductory Remarks
COTILLION ROOM

Session A-1 COTILLION ROOM

Chairperson: Dr. J. Quintiere
National Bureau of Standards

FIRE RESEARCH

- 8:30 a.m. 1. Fundamentals of Radiative Transfer in Combustion Systems, (Invited Paper), *F. R. Steward, University of New Brunswick*
- 9:15 a.m. 2. Recent Advances in Radiation from Fires, (Invited Paper), *J. deRis, Factory Mutual Research*
- 10:00 a.m. 3. Radiation from Burning Hydrocarbon Clouds, *J. A. Fay, G. J. Desgroseilliers, and D. H. Lewis, Massachusetts Institute of Technology*
- 10:20 a.m. Coffee Break
- 10:50 a.m. 4. Distribution of Radiant Power in Plastic Pool Fires, *G. H. Markstein, Factory Mutual Research*
- 11:10 a.m. 5. Radiation from Products of Combustion, *A. T. Modak, Factory Mutual Research*
- 11:30 a.m. 6. The Effects of Orientation of Sample on Radiative Ignition of Combustible Solids, *T. Kashiwagi, National Bureau of Standards*
- 11:50 a.m. 7. Effect of Surface Radiation on Extinction, *A. Kulkarni and M. Sibulkin, Brown University*
- 12:10 p.m. Lunch Break

Session A-2 COTILLION ROOM

Chairperson: Dr. R. Friedman
Factory Mutual Research

FIRE RESEARCH (Continued)

- 2:00 p.m. 8. Purely Buoyant Diffusion Flames, *B. J. McCaffrey, National Bureau of Standards*
- 2:20 p.m. 9. Fire Impingement on a Ceiling, *H-Z. You and G. M. Faeth, Pennsylvania State University*
- 2:40 p.m. 10. Mean Structure of the Pyrolysis Zone of a Turbulent Wall Fire, *T. Ahmad and F. Tamanini, Factory Mutual Research*
- 3:00 p.m. 11. An Experimental Study of the Pathways of Heat Transfer in Horizontal Flame Spread, *S. R. Ray, A. C. Fernandez-Pello, and I. Glassman, Princeton University*
- 3:20 p.m. 12. A New Method for Measuring Lateral and Downward Flame Spread Rate as a Function of Surface Temperature, *T. C. Creighton, Armstrong Cork Company*
- 3:40 p.m. Coffee Break
- 4:10 p.m. 13. Fire Spread on a Vertical Wall, *K. Annamalai and M. Sibulkin, Brown University*
- 4:30 p.m. 14. Modeling of Flame Spread and Wall Burning in Freeburn Corner Fire Tests, *M. A. Delichatsios, Factory Mutual Research*

Session B-1 PALLADIUM ROOM

Chairperson: Dr. F. W. Williams
Naval Research Laboratory

CHEMICAL KINETICS

- 8:35 a.m. 39. Kinetic Studies of Methanol Oxidation, (Invited Paper), *F. L. Dryer, Princeton University and C. K. Westbrook, Lawrence Livermore Laboratories*
- 9:20 a.m. 40. Spectral Emission Measurements for Methanol Combustion in a Jet-Stirred Reactor, *S. Singh, W. Grosshandler, and P. C. Malte, Washington State University*
- 9:40 a.m. 41. Low Temperature Pyrolysis Studies by Chemiluminescence Techniques, *H. N. Volltrauer and A. Fontijn, AeroChem Research Laboratories, Inc.*
- 10:00 a.m. 42. Electron Spin Resonance of the Products of Pyrolysis of HMX and RDX, *C. U. Morgan and R. A. Beyer, Ballistic Research Laboratory*
- 10:20 a.m. Coffee Break
- 10:50 a.m. 43. Overall and Detailed Kinetic Studies of Propane Pyrolysis, *D. Hautman, R. J. Santoro, and I. Glassman, Princeton University*
- 11:10 a.m. 44. Measurements of H Atom Concentrations in Reacting Hydrogen-Oxygen Mixtures, *C-C. Chiang and G. B. Skinner, Wright State University*
- 11:30 a.m. Lunch Break

Session B-2 PALLADIUM ROOM

Chairperson: Dr. R. G. Gann
National Bureau of Standards

CHEMICAL KINETICS (Continued)

- 2:00 p.m. 45. The Significance of the Transition Flame, *R. S. Sheinson, J. E. Hahn, D. Indritz, and F. W. Williams, Naval Research Laboratory*
- 2:20 p.m. 46. Chemiluminescence from the Oxidation of Azomethane, *D. Indritz, H. Rabitz, F. W. Williams, and R. S. Sheinson, Naval Research Laboratory*
- 2:40 p.m. 47. Low Pressure Studies of Peroxy and Alkoxy Radical Chemistry Initiated by Addition of Alkanes to Discharged Oxygen, *D. J. Bogan, F. W. Williams, Naval Research Laboratory, and J. J. Havel, Pennsylvania State University*
- 3:00 p.m. 48. Mass Spectrometer Sampling of the Quench Zone of $\text{CH}_4\text{-O}_2\text{-Ar}$ Flame, *T. M. Sloane and J. W. Ratcliffe, General Motors Research Laboratories*
- 3:20 p.m. 49. Flame Structure Study of a CF_2Br_2 Inhibited Methane Flame. The Effect of 1.1% CF_2Br_2 on Composition, Rate Constants, and Net Reaction Rates, *C. P. Lazzara, J. F. Papp, and J. C. Biordi, Bureau of Mines*
- 3:40 p.m. Coffee Break
- 4:10 p.m. 50. Effect of Pressure on Rate Constants. A Priori Predictions for Simple Flame Reactions, *G. F. Adams, Ballistic Research Laboratory*

Thursday, November 30, 1978

Session A-3

COTILLION ROOM

Chairperson: Prof. T. Y. Toong
Massachusetts Institute of Technology

FIRE RESEARCH (Continued)

- 8:30 a.m. 16. Oxygen Consumption Calorimetry, *C. Huggett, National Bureau of Standards*
- 8:50 a.m. 17. New Concept for Rate of Heat Release Measurements by Oxygen Consumption, *D. L. Sensenig, Armstrong Cork Company and W. J. Parker, National Bureau of Standards*
- 9:10 a.m. 18. Quantification of Fire Suppressant Action on Liquid Pool Fires, *R. S. Sheinson, G. I. Gellene, F. W. Williams, and J. E. Hahn, Naval Research Laboratory*

EXPLOSION RESEARCH

- 9:30 a.m. 19. Vapor Cloud Explosions, (Invited Paper), *R. A. Strehlow, University of Illinois*
- 10:15 a.m. Coffee Break
- 10:45 a.m. 20. On the Mechanism of Transition from Deflagration to Detonation in Vapor Cloud Explosions, (Invited Paper), *J. H. Lee, McGill University*
- 11:30 a.m. 21. Shock Wave Amplification through Coherent Energy Release, *J. H. Lee, P. A. Thibault, and N. Yoshikawa, McGill University*
- 11:50 a.m. 22. Flame Acceleration due to Turbulence Produced by Obstacles, *M. Donato, J. H. Lee, and I. O. Moen, McGill University*
- 12:10 p.m. Lunch Break

Session A-4

COTILLION ROOM

Chairperson: Prof. R. A. Strehlow
University of Illinois

EXPLOSION RESEARCH (Continued)

- 2:20 p.m. 23. Determination of the Critical Energy and of Subcritical Propagation in the Direct Initiation of Detonations, *M. Sichel and R. D. Oza, University of Michigan*
- 2:40 p.m. 25. Correlation of the Detonability of Unconfined Fuel Aerosols with Laboratory Tests, *P. Lu, B. Fishburn, and N. Slagg, U.S. Army Armament Research and Development Command (not included)*
- 3:00 p.m. 26. Induced Heterogeneous Detonation in Hypergolic Fuel/Oxidizer Dispersions, *A. J. Tulis, IIT Research Institute*
- 3:20 p.m. Coffee Break
- 3:50 p.m. 27. Recent Studies of Coal Dust Explosions, (Invited Paper), *D. Burgess, Bureau of Mines*
- 4:35 p.m. 28. Explosive Combustion of Coal Dust, *E. Ural, R. VanDyk, C. W. Kauffman, and J. A. Nicholls, University of Michigan*
- 4:55 p.m. 29. Measurements of Particle and Gas Temperatures of Coal Dust Explosions and Flames, *K. L. Cashdollar and M. Hertzberg, Bureau of Mines*
- 5:15 p.m. 30. Resonance Tube Ignition of Aluminum, *B. R. Phillips, NASA Lewis Research Center, and K. J. DeWitt, University of Toledo*

5:35 p.m. Business Meeting

COTILLION ROOM

Session B-3

PALLADIUM ROOM

Chairperson: Dr. A. Fontijn
AeroChem Research Laboratories, Inc.

SOOT FORMATION

- 8:30 a.m. 52. Ionic Mechanisms of Soot Formation in Flames, (Invited Paper), *H. F. Calcote, AeroChem Research Laboratories, Inc.*
- 9:15 a.m. 53. Fundamental Aspects of the Mechanisms of Smoke Generation by Burning Materials, *C. P. Bankston, B. T. Zinn, R. F. Browner, and E. A. Powell, Georgia Institute of Technology*
- 9:35 a.m. 54. Smoke Point Determinations of Hydrocarbon Diffusion Flames, *K. Van Treuren, I. Glassman, and K. P. Schug, Princeton University*
- 9:55 a.m. 55. Sooting Characteristics of Gaseous Hydrocarbon Diffusion Flames and the Effect of Additives, *Y. Manheimer-Timnat, I. Glassman, R. J. Santoro, and P. Schug, Princeton University*
- 10:15 a.m. Coffee Break

GENERAL

- 10:45 a.m. 56. High Temperature, Catalytic Combustion, *P. Walsh, C. Bruno, B. S. Kim, D. A. Santavica, and F. V. Bracco, Princeton University*
- 11:05 a.m. 57. Catalytic Combustion: The Effect of Fuel and Surface on Efficiency, *P. J. Marteney and A. S. Kesten, United Technologies Research Center*
- 11:25 a.m. 58. Observation of Laser-Excited Fluorescence in the A-X System of NH, *W. R. Anderson, D. R. Crosley, J. E. Jones, and J. E. Allen, Jr., Ballistic Research Laboratory*
- 11:45 a.m. 59. Combustion of Polyvinyl Chloride Studied by a Low Pressure Moving Wire Technique, *L. W. Hunter, C. Grunfelder, C. H. Hoshall, and R. M. Fristrom, Applied Physics Laboratory*
- 12:05 p.m. Lunch Break

Session B-4

PALLADIUM ROOM

Chairperson: Prof. G. M. Faeth
Pennsylvania State University

GENERAL

- 2:00 p.m. 60. An Examination of the Mechanism of Flame Stabilization by the Interaction of a Rich Two-Phase Combustible Mixture Jet with a Counter Air Stream, *I. Wierzb, Aviation Institute-Poland/University of Calgary*
- 2:20 p.m. 61. Bluff Body Stabilization of Premixed-Prevaporized Flames, *I. C. Ball, D. H. Rummel, H. G. Semerjian, and A. Vranos, United Technologies Corporation*
- 2:40 p.m. 62. An Experimental Investigation of the Instability of Flame Fronts Propagating Within Homogeneous Mixtures in Circular Tubes, *O. Badr, Auburn University, and G. A. Karim, University of Calgary*
- 3:00 p.m. 63. The Behavior of Oil Sand Fragments in Hot Oxidizing Streams, *G. A. Karim and M. Bardon, University of Calgary*
- 3:20 p.m. Coffee Break
- 3:50 p.m. 64. Combustion Studies of Water/Oil Emulsions on a Commercial Boiler Using Low and High Sulfur Fuel Oil, *J. Dooher, R. Genberg, S. Moon, B. Gilmarin, S. Jakatt, J. Skura, and D. Wright, Adelphi University*
- 4:10 p.m. 65. Dynamics of Exploding Drops, *T. Morrone, R. Lippman, and D. Wright, Adelphi University*
- 4:30 p.m. 66. Effect of Probe Design and Burner Operating Parameters on NO_x Measurements, *N. P. Cernan-sky and S. Singh, Drexel University*
- 4:50 p.m. 68. A Pulsed-Illumination, Closed-Circuit Television System for Real Time Viewing of Unsteady (1μsec) Events, *W. W. Marden, R. L. Steinberger, and F. V. Bracco, Princeton University*
- 5:10 p.m. 15. The Effect of Ventilation on Smoldering Fires of Carbon - Impregnated Polyurethane Foam, *P. A. ... F. W. Williams, Naval Re-*

Friday, December 1, 1978

Session A-5

COTILLION ROOM

Chairperson: Dr. E. K. Bastress
Department of Energy

COAL COMBUSTION

- 9:15 a.m. 32. A Computational Examination of the Effects of Coupled Heat Transport and Chemical Kinetics Upon Single Particle Coal Pyrolysis, *J. D. Freihaut and F. J. Vastola, Pennsylvania State University*
- 9:35 a.m. 33. A Model for the Combustion and Gasification of Porous Coal Chars, *G. A. Simons, P. F. Lewis, and M. L. Finson, Physical Sciences Inc.*
- 9:55 a.m. 35. The Flammability Limits of Coal Dust/Air Mixtures, *M. Hertzberg and K. L. Cashdollar, Bureau of Mines*
- 10:15 a.m. Coffee Break
- 10:45 a.m. 36. Measurement of the Species Concentration Produced During Pyridine Combustion, *R. C. Peterson, R. P. Lucht, N. M. Laurendeau*
- 11:05 a.m. 37. Nitric Oxide Formation in Flat, Coal Dust/Oxygen/Diluent Flames, *S. L. Chen, R. A. Altenkirch, and R. E. Peck, University of Kentucky*
- 11:25 a.m. 38. Combustion Characteristics of Droplets of Water-in-Oil Emulsions and Coal-Oil Mixtures, *C. K. Law, C. H. Lee, and N. Srinivasan, Northwestern University*

Session B-5

PALLADIUM ROOM

Chairperson: Prof. T. A. Brzustowski
University of Waterloo

MODELING

- 8:30 a.m. 69. Detailed Modeling of Reactive Flows, (Invited Paper), *E. S. Oran, Naval Research Laboratory*
- 9:15 a.m. 70. A Numerical Study of Planar, Turbulent, Reacting Mixing Layers, *S. F. Parker and W. A. Sirignano, Princeton University*
- 9:35 a.m. 71. Radiative Augmentation of Combustion: Modeling, *A. E. Cerkanowicz, J. G. Stevens, and W. Bartok, Exxon Research and Engineering Company*
- 9:55 a.m. 72. Laser-Doppler Velocimetry Measurements in a Simulated Engine Flow, *A. Gany, J. A. C. Humphrey, J. I. Ramos, J. J. Larrea, and W. A. Sirignano, Princeton University*
- 10:15 a.m. Coffee Break
- 10:45 a.m. 73. Ignition Under Crossflow Conditions, *A. Birk, L. H. Caveny, and W. A. Sirignano, Princeton University*
- 11:05 a.m. 74. A Model for Flame Propagation from a Hot Gas Pocket in a Liquid Fuel Spray, *C. E. Polymeropoulos, Rutgers*