

International Thermal Treatment Technologies (IT3) & Hazardous Waste Combustors (HWC) Joint Conference 2009

CP-183

**Cincinnati, Ohio, USA
18-21 May 2009**

ISBN: 978-1-61567-183-0

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2009) by the Air and Waste Management Association
All rights reserved.

Printed by Curran Associates, Inc. (2009)

For permission requests, please contact the Air and Waste Management Association
at the address below.

Air and Waste Management Association
One Gateway Center, 3rd Floor
420 Fort Duzuesne Blvd.
Pittsburgh, Pennsylvania 15222-1435

Phone: 800 270 3444
Fax: 412 232 3450

www.awma.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Session 1A: Plastics

Chair: H. Seifert

Synergies of Biomass and Solid Recovered Fuel in Grate Type Energy from Waste Plants	1
<i>H. Gehrman, T. Kolb, H. Seifert, F. Mark, M. Frankenhaeuser, A. Schanssema, K. Wittstock, J. Kolb</i>	
The Effect of the Reinforcement on the Degradation Behavior of Cloth-type-CFRP Under Microwave Dielectric Heating	17
<i>P. Nguyen</i>	

Session 2A: Modeling

Chair: P. Falcone

Thermal Decomposition of Cardboard Wastes Using Steam Gasification	28
<i>H. Molintas, A. Gupta</i>	
Numerical Simulation of Heat Transfer and Fluid Flow in a DC Plasma-arc Reactor for the Thermal Treatment of Hazardous Wastes	45
<i>J. Deng, Y. Li, J. Zhang, J. Tian, Y. Xu, H. Sheng</i>	
Mass and Energy Balance Software Improves Performance of Rotary Kiln Incinerator	58
<i>W. Norris, M. Mannuzza</i>	

Session 3A: Plasma

Chair: F. Lemont

Plasma Gasification and Melting Technology, A Novel Solution for Medical Waste Treatment	70
<i>L. Dor</i>	
Destruction of POPs Agents in a Plasma-arc Reactor and Equilibrium Calculations of Steam Injected for Syngas Recovery	71
<i>J. Tian, Y. Li, R. Wang, Y. Xu, H. Sheng</i>	
Introduction to Plasco's Commercial Scale Demonstration of its Proprietary Plasma Conversion System	79
<i>A. Tsangaris</i>	
Validation of the Plasma Resource Recovery System Simulations	93
<i>L. Rao, C. Guedehoussou, C. Derboghossian, A. Kaldas, P. Carabin</i>	

Session 3C: Reuse and Recycling: Opportunities and Challenges

Chair: E. Guerra

The Big Squeeze	103
<i>M. Benoit</i>	
From Waste to an Engineered Fuel: The Challenges and Opportunities in the Current Environment	112
<i>R. Davies</i>	
Formation, Release and Control of Dioxins in Cement Kilns Co-Processing Wastes	129
<i>K. Karstensen</i>	

Session 4A: Processes for Greenhouse Gas Reduction

Chair: D. Leavitt

A Comparison of Landfill Gas to Energy Technologies	155
<i>K. Westby, M. Castaldi</i>	
Sludge Dryer Wet Scrubber Used to Produce Renewable Energy	167
<i>A. Bartocci</i>	
Waste Heat Recovery Power Generation with WOWGen®	173
<i>N. Giurgea</i>	

Session 4B: Handling Mercury

Chair: T. Eicher

Waste-to-Energy Combustors: two sets of pollutants; two different stories	205
<i>S. Zemba, M. Ames, L. Green</i>	
Estimating Mercury Emission Factors and Total Emission from Major Anthropogenic Sources in Korea	220
<i>J. Kim, D. Pudasainee, S. Lee, S. Son, Y. Yoon, Y. Seo</i>	
Impact of Elimination of Mercury Removal Pretreatment on Performance of a High Level Radioactive Waste Melter Offgas System	237
<i>J. Zamecnik, A. Choi</i>	
Integrated Scrubber & Wet Electrostatic Precipitator Reduces HAPS Emissions at Secondary Lead Smelter Facility	272
<i>A. Bartocci</i>	

Session 4C: Testing and Instrumentation

Chair: M. J. Krall

Bag Leak Detector Recordkeeping and Reporting	279
<i>R. Baxter</i>	
Sampling Challenges for High Level Inlets	287
<i>R. Adams</i>	
On-site Sampling and Analysis Using EPA Method 30B to Determine Mercury Partitioning Through a BIF Unit	N/A
<i>M. Krall</i>	
ASTM Standard D 7932-07 for Certification of PM Detectors and Bag Leak Detectors and Its Challenges	292
<i>J. Peeler</i>	

Session 5A: Greenhouse Gas Reduction

Chair: P. Carabin

A Sustainable Strategy for Reduction of Greenhouse Gas Emission and Waste Management in Agro Based Industries	304
<i>J. Tiwari, S. Sharma, A. Ramanathan, V. Subramania</i>	
HFC-23 Decomposition Process by Using Plasma Destruction and Feasibility of the CDM Project	310
<i>J. Lee, H. Jeong, K. Yoo, W. Chang, H. Lee</i>	

Session 5B: Gasification

Chair: H. Molintas

An Investigation into the Syngas Production Enhancement from Municipal Solid Waste Gasification Under Various CO₂ Concentration Atmospheres	323
<i>E. Kwon, K. Westby, M. Castaldi</i>	

Session 6A: Biomass for Greenhouse Gas Reduction

Chair: J. Lee

Characterisation of Refuse Derived Fuels in View of the Corrosion Potential	337
<i>M. Beckmann, M. Pohl, S. Ncube, K. Gebauer, W. Spiegel, W. Muller</i>	
Evaluation and Examples of Biomass Utilization Concepts	348
<i>M. Beckmann, M. Klemm, D. Bohning</i>	
Biomass to Fuels: The Impact of Reaction Medium and Heating Rate	358
<i>M. Castaldi</i>	

Session 6B: Emissions Control Strategies

Chair: A. Bartocci

Dioxin Removal in Hazardous Waste Incineration Using Adiox®	377
<i>P. Lindgren, S. Anderson</i>	
The Reaction Mechanism of HCl with CaO in the Presence of Steam	385
<i>R. Wang, J. Zhang, J. Tian, Y. Xu, H. Sheng</i>	

Session 6C: HWC MACT and Related Technical Topics

Chair: H. McHale

Stability of HWC Emissions Results Over Seven Years	393
<i>R. Wood</i>	
Hazardous Waste Combustion MACT - Alternative Monitoring and Waivers	403
<i>H. Shah</i>	
Scheduling Hazardous Waste Incinerators Using a SA-LP Heuristic	413
<i>C. Schulte, J. Curry</i>	

Session 7A: Waste Oils and Solids

Chair: J. R. Zamecnik

Thermal Production and Combustion Gas Components of a Mixture of Waste Oil and Waste Liquid	423
<i>S. Torii, J. Yoshikawa, H. Ikebe</i>	
Multiusing Cashew Nut Shells as Solid and Liquid Biofuel	435
<i>A. Tsamba</i>	

Session 7B: Emissions Control Strategies (continued)

Chair: A. Bartocci

Low-temperature Selective Catalytic Reduction of De - NO_x Based on Iron-based Catalysts	441
<i>K. Gui, G. Yao, F. Wang</i>	

Session 7C: HWC MACT and Related Technical Topics (continued)

Chairs: H. McHale, M. Keener

The Curious Case of the CPT	449
<i>M. Gehring, S. McHale</i>	

Session 8A: Automobile Shredder Residue

Chair: C. R. Doolittle

Studies on Gasification and Melting Characteristics of Automobile Shredder Residue	450
<i>S. Cho, Y. Seo, H. Jung, S. Roh, W. Kim</i>	
Kinetic Study of Decomposition of ASR Residues After Pyrolysis in Inert and Oxidative Atmosphere	465
<i>P. Donaj, W. Yang, W. Blasiak</i>	
Benefits of Holistic Shredder Residue Recovery: Mechanical Recycling and Energy Recovery	484
<i>T. Allen, J. Kolb</i>	

Session 8B: Coal and Biomass

Chair: R. Cross

Combined Gasification of Woody Biomass and Coal in Down-flow Entrained Bed	492
<i>Y. Itaya, A. Fujimori, S. Hatano, N. Kobayashi</i>	
Economical Technologies for Removing Sulfur and Nitrogen from Coal Before Combustion	502
<i>K. Hughes, E. Someus, P. Smith</i>	

Session 9A: Munitions

Chair: P. Lemieux

Modeling the Thermal Destruction of Chemical Warfare Agents Bound on Building Materials	503
<i>P. Lemieux, J. Wood</i>	
A Numerical Model for the Metal Parts Furnace	511
<i>M. Denison, C. Senior, A. Sarofim, M. Bockelie</i>	
Comprehensive Performance Test Results for the Explosive Waste Incinerator after Completing the Department of the Army Modernization	526
<i>J. Swanson, C. Snider, T. Busmann, C. McBride, S. Brockman</i>	

Session 9B: Thermal Desorption

Chair: P. Acharya

Friction-Based Thermal Desorption Technology: A Case Study in Processing Drill Cuttings	527
<i>M. Kapila, A. Murray, I. Batinic, P. Gover, P. Handgraaf, R. Hood</i>	
Thermal Desorption Treatment of Dioxin Contaminated Soil at the Former Allied Feeds Site, Sydney Australia	541
<i>W. Troxler, J. Hunt, J. Taylor, C. McNiven</i>	

Session 9C: Risk

Chair: M. Gehring

Difficulties Demonstrating Compliance with a Possible One-Hour NAAQS for SO₂	557
<i>M. Ames, S. Zemba</i>	

Poster Session

Chair: M. Castaldi

A Study on the SO₂ Removal Efficiency by Different Shapes of Rapid-mixing Facility	566
<i>J. Chung, J. Kim, K. Koo, S. Hwang, T. Shin, E. Jung, B. Kim</i>	
The Influence of Temperature, Wet and Production Locality on Hydrogen Gas Generation from Refuse Derived Fuel and the Mechanism of Generation	571
<i>N. Nagatsuka, A. Narumi, Y. Iida</i>	
The Impact of Additives on the Formation and Leaching Characteristics of the Vitrified Slag	578
<i>J. Zhang, Y. Li, Y. Xu, H. Sheng</i>	
A Study on the Incineration of Leachate Generated from Food Waste Using the Pilot Plant for Stoker System	587
<i>J. Chung, J. Song, J. Kim, S. Hwang, K. Koo</i>	
PFCs Thermal Decomposition Using 500kw Class Atmospheric Pressure Plasma	593
<i>J. Chung, S. Hwang, J. Lee, W. Chang, S. Byeon, J. Mun, J. Kim, S. Chae</i>	
Author Index	