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Conference Speakers

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Honorary Speaker



Mr. Chatree Watanakhajorn Acting Director of Environment Bureau Bangkok Metropolitan Administration (BMA)

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Keynote Speakers

Waste Utilization for Sustainable Energy Resources



Prof. Dr. Ashwani K. Gupta Department of Mechanical Engineering University of Maryland, College Park, MD 20742, USA

Abstract

Clean energy harvesting from various kinds of feedstocks is a challenge but recent research and development efforts show a novel fuel reforming path that can be used in a wide variety of industries extending from commercial to aerospace application. Fuels of different physical and chemical properties could be made available; however, they must be tailored for specific applications. In addition it is important that we effectively and efficiently use low grade fuels and reform them to cleaner fuels, such as wastes and biomass to hydrogen and methane. Carbon dioxide is a greenhouse gas that is known to contribute to global warming. Although there are other contributors to global warming but the share of CO_2 is significant. Most of the CO_2 is produced from the combustion of fossil fuels and our use of fossil fuels has been increasing due to increased activity and population. The carbon during the combustion process is converted to CO_2 with the subsequent release of thermal energy. In many parts of the world most of the electricity is produced from fossil fuels, with coal being the highest. The demand for electricity continues to grow in the developed countries with significant more in some of the developing countries. This has resulted in dramatic increase in global ambient concentrations of CO_2 . Significant efforts are being pursued to curtail the emission of CO_2 or capture and store it in order to maintain the ambient concentrations to some acceptable levels.

This talk will focus on reforming wastes and biomass to clean energy with due consideration to energy sustainability, global climate change and mitigation of greenhouse gases emission to the environment. The emphasis will be on sustainability with due considerations to efficiency and fuels used in different energy using sectors. Carbon emissions continue to increase through the increase use of fossil fuels but fossil fuels offer are near carbon neutral. Gasification and pyrolysis are important steps to reform the fuel properties so that they can be used in the current energy conversion systems for various energy and power use with due consideration to environmental impact. Gasification results from a lab scale reactor and its effect on syngas yield and characteristics will be provided using different feedstock materials.

Biography

Dr. Gupta is Distinguished University Professor at the University of Maryland. He obtained his Ph.D. from the University of Sheffield, UK and was awarded higher doctorate (D.Sc) from the University of Sheffield and from The University of Southampton. He was awarded Honorary Doctorates from King Mungkut University of Technology North Bangkok, Thailand, University of Wisconsin Milwaukee and University of Derby, UK. He has received several honors and awards form AIAA (Energy Systems Award, Propellants and Combustion Award, Air Breathing Propulsion award, Pendray award), and ASME (George Westinghouse Gold medal, James Harry Potter Gold medal, James N. Landis medal, Worcester Reed Warner medal, Holley medal, Honda medal, ASME-AIM Percy Nicholls award, Melville medal, ASME Honorary member), and ASEE Ralph Coats Roe Award. At the University of Maryland he was awarded the College of Engineering Research award and President Kirwan Research Award. He was awarded several Best Paper awards from ASME and AIAA. He is Fellow of AIAA, ASME, SAE, AAAS, and RAes (UK).

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Dioxins in Waste Incineration – from Problem to Solution

Dr. Juergen Vehlow Karlsruhe Institute of Technology, retired

Abstract

In 1977 Olie, Vermeulen, and Hutzinger were the first to detect dioxins in fly ashes from waste incineration plants. The toxicity of these compounds was known, but not their source in the process. Hence violent discussions and with that strong public opposition against waste incineration emerged in many countries. But at the same time extended research and development programs were launched to understand the formation of these compounds and revealed in short time their main formation mechanisms by identifying the most important operation parameters (good combustion control, clean boilers) and the influence of specific waste ingredients (halogens, sulphur, some heavy metals) controlling their generation. This acquired knowledge paved the way for strategies to minimise their formation and to achieve an efficient abatement. The main steps in this development as well as the current situation are described.

Biography

Retired since August 2006, consulting scientist Deputy head of Institute for Technical Chemistry (ITC) at Karlsruhe Institute of Technology, Karlsruhe, Germany Qualifications: diploma (chemistry) by Berlin Free University, Ph. D. (electrochemistry / radiochemistry) ibid.

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Accomplishment and perspectives on the international cooperation in new climate change era

Jongsoo Jurng Director General, Green Technology Center of Korea

Abstract

The Green Technology Center (GTC) of Korea, established in 2013 as a policy research center specializing in green climate technology, has been fulfilling its primary role of researching green technology development policy and international cooperation on climate technology. Following the 2015 Paris Agreement, increased importance has been placed on policy and international cooperation for climate change technology transfer. In Korea, climate change technology has emerged as a means of reducing greenhouse gas emissions and has been magnified as a core technology for the resolution of various social problems, too. In order to actively address national and global environmental issues, GTC is making great efforts to lead on new innovations and challenges by reflecting paradigm transformation for the realization of the creative economy. This lays the groundwork to pass down a healthy and sustainable environment for future generations. By strengthening global leadership through the establishment of a Korean climate technology cooperation model, the GTC is making efforts for the global expansion of domestic climate technology industries as well as for the establishment of and progress towards domestic greenhouse gas emission reduction goals. Waste-to-Energy is one of the main agenda that GTC has explored in perspective of an effective solution for climate change mitigation. GTC has supported the technical assistance on policy development and feasibility study, capacity building program, and demonstration and its performance evaluation. Under the framework of sustainable solid waste management, the practical approaches to applying the wasteto-energy solutions have been investigated with respect to their social, environmental and economic impacts.

Biography

2018. 4 - Present Director General, Green Technology Center of Korea

2011. 9 - Present Professor (adj.), Green School, KIST-Korea Univ.

2011. 3 - Present Principal Research Scientist, Green City Technology Institute, KIST

2013 Visiting Scholar, Univ. of Texas, Austin, USA

2010. 4 - 2013. 4 Expert Committee member, National Science and Technology Commission

2009.11 - 2011.3 Director, Environment Division, KIST

2005.5 - 2009.11 Head, Center for Environmental Technology Research, KIST

2003.11 - 2005.5: Policy Analyst, the Office of the Prime Minster, Korea

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High Quality Solid Fuel Production from Biomass and Wastes Employing the Hydrothermal Treatment

Kunio Yoshikawa Tokyo Institute of Technology

Abstract

Up to now, the only commercialized ways of municipal solid waste (MSW) treatment are mass land-filling and mass burning. In Japan, most of burnable wastes are incinerated, but not in other countries, and still land-filling is the most popular way of waste treatment all over the world. But the world recent trend is to prohibit or limit land-filling of wastes while citizens do not want to increase waste incineration in developed countries as well as developing countries. On the other hand, major part of the world is discharging non-segregated municipal solid wastes. Thus we have to find out the utilization ways alternative to incineration for nonsegregated MSW. Pre-treatment of wastes requires crushing, drying and deodorizing, which are normally different processes. But we have developed innovative hydrothermal treatment technology (HTT) which can perform these three pre-treatment functions in one process utilizing high pressure saturated steam. Figure 1 shows the operating principle of HTT. Non-segregated MSW are fed into the reactor, and then, 220, 2.5MPa saturated steam is supplied into the reactor for about 30 minutes and the blades installed inside the reactor rotates to mix MSW and steam for about 10 minutes. Then the product is discharged after extracting steam. The product is powder-like substance and the moisture content is almost the same as the raw material, but is easily dried by natural drying. The inert material such as metal, glass and stones can be easily sieved out after drying. There is almost no bad smell in the solid products, and the products can be used as solid fuels which can be easily mixed with coal for power generation or cement production. Only 10-15% of the product is enough for steam production in a boiler. HTT has already commercialized in Japan, China and Indonesia.

Biography

Prof. Kunio Yoshikawa was born in 1953 in Tokyo, Japan. He is a professor of Tokyo Institute of Technology and an associate editor of Applied Energy. His bachelor, master and doctor degrees were awarded from Tokyo Institute of Technology.

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Waste to Energy in China: Status and Prospects

Prof. Yong CHI Zhejiang University

Abstract

With the rapid development and urbanization, the proper treatment of Municipal Solid Waste (MSW) is of increasing importance. Waste to Energy (WtE) is an effective technology of MSW treatment while recover the energy, and it plays a major role in China. The status of MSW treatment and management will be introduced. The technical development and tend will be introduced and discussed: 1. Increase of treatment capacity of incinerators; 2. Very low flue gas emission control technology; 3. Efficient energy recovery systems; 4. Coincineration of MSW with other wastes; 5. Assessment of waste management.

Biography

Ph.D. and Professor, School of Energy Engineering, Zhejiang University, Hangzhou China

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Technological Status and Issues on Waste to Energy in Korea and Asian Countries

Prof. Yong-Chil Seo Yonsei University, Republic of Korea

Abstract

The generation and management of waste in Asian countries are varying by each country's situation, and so are the statuses of waste to energy (WtE) as well. Korean history of waste management and WtE utilization are going to be discussed and the other countries which have been actively adopted and going to utilize WtE technologies will also be introduced comparatively. Two times of WtE policies and utilization strategies would make the rate of WtE up to 20% among total municipal solid waste (MSW) generated in Korea. Of course it has played very significant role for effective waste management in integrated manner. Japan already adopted WtE plants long years ago, while China has constructed most of incinerators recent years, which currently reaches more than 300 large scale plants for MSWs. Other Asian countries may be in the situation to start to consider or construct MSW WtE plants. These developing countries may learn from such utilization histories of WtE adoption in Japan, Korea and China. Not only combustion technology but also advanced technologies such as gasification, solid refuse fuel (SRF), and bio-gas production for organic waste, are also to be future and present options as WtE technologies. To give insights and future investigations, several R&Ds performed recently and collaboration efforts for developing technologies are going to be introduced in the lecture.

Biography

BS, Chem. Eng., 1977.2, Yonsei Univ., Korea
Ph.D., Chem. Eng., 1985.8, Illinois Institute of Technology, U.S.
Dean, The Graduate School for Health and Environment
Dean, College of Health Science, Wonju Campus, Yonsei University (2006.1 - 2008.1)
Adjunct Professor, Chemical Engineering Department Wuhan Institute of Technology,
China (2007.12 - 2010.12), Southeast University, China (2017-)
Visiting Professor, USEPA and NCSU Mechanical Engineering, USA (2008.9 - 2009.8)
Board member, Korea Electronics Recycling Cooperative (2011.6 - present)
Editor in Chief, Journal of Material Cycles and Waste Management (2012.3 - 2016.2)
President, Korea Society of Waste Management (2012.1 - 2013.12)
Int'l Advisory Board member, INES, Japan (2017.8-2020.8)
Board member and Vice President, WTERT-ASIA, China (2017-)
Technical Expert Member, UNEP Mercury Working Group. (2014 -)