

第7回ポリマーフィードストックリサイクル国際会議(7th ISFR)報告

産業技術総合研究所 安田 肇

2013年10月23日～26日の4日間、“7th International Symposium on Feedstock Recycling of Polymeric Materials” (ISFR2013)がインド、ニューデリーの India Habitat Centre (インディアハビタットセンター)で開催された。主催は CSIR-Indian Institute of Petroleum、FSRJ、Council of Scientific and Industrial Research (CSIR)の3組織で、The Indian Centre for Plastics in the Environment (ICPE)の共催の他、プラスチック循環利用協会と塩ビ工業・環境協会のサポート他インドの各団体の協力のもと、CSIR-IIPのM. O. Garg氏をChairmanに、また、日本にも長く滞在したT. Bhaskar氏がOrganizing Secretaryとして準備・運営にあたった。約120件の発表のうち、インド国外から約70件で、日本、スペイン、韓国、ハンガリー、オーストリア、ベルギー、フィンランド等合計20ヶ国から寄せられた。今回はセッションが技術ではなく対象物で分類され、基調講演・招待講演・2回のパネルディスカッションの他、対象物としてプラスチック、バイオマス、廃家電のセッションで構成され、その比率は約3:2:1、口頭発表とポスター発表の比率は1:1であった。また、本大会ではブレインストーミングのセッションなどユニークな試みも行われた。最終日に口頭7件、ポスター3件の表彰が行われ、日本からは、東北大学のFonseca氏、熊谷氏、千葉大学の伊藤氏が受賞した。また、次回は2015年にオーストリアで開催予定と発表された。

以下に当日の写真を沿えたプログラムを掲載する。

23rd October, Wednesday

8:00 onwards Registration

8:50 – 9:00 Welcome Remarks

Dr. M. O. Garg, Chairman, 7th ISFR 2013 & Director, CSIR-Indian Institute of Petroleum, India (8:50 - 8:55)

Dr. H. Tagaya, President, FSRJ, Japan & Professor, Yamagata University, Japan (8:55 – 9:00)

9:00 - 9:30 Keynote Lecture

Waste Plastics to Transportation Fuel and Petrochemicals

S. Kumar, H. U. Khan, M. Sahai, A. Kumar, S. M. Nanoti, M. O. Garg

9:30 – 11:35 Technical Session I: WEEE Conversion

PT 01 Recycling of WEEE Plastics

A. Buekens (9:30 - 10:00)

IT 01 Pollutant Formation During the Thermal Decomposition of Electrical and Electronic Wastes



会場の India Habitat Centre



Garg氏による Welcome remark

J. A. Conesa, J. Moltó, R. Font, S. Egea, N. Ortuño (10:00 – 10:25)
 IT 02 Industry Initiative for Recycling of PVC Products in Japan
 S. Seki (10:25 - 10:50)
 CT 01 Study on Behavior of Antimony, Zinc, Lead and Iron Oxides During Thermal Processing of BFR-Containing Waste
 Plastics with Using a Laboratory Furnace
 M. Grabda, S. Oleszek, E. Shibata, T. Nakamura (10:50 - 11:05)
 CT 02 Effect of Coexisting Materials on Steam Gasification of E-Waste
 J. A. Salbidegoitia, M. P. González-Marcos, J. R. González-Velasco, T. Bhaskar, T. Kamo (11:05 - 11:20)
 CT 03 Recycling of E-Waste Initiative in Japan
 M. Takao (11:20 - 11:35)
 11:35 - 11:50 Tea Break
 11:50 - 13:05 Technical Session II: Plastics Conversion
 PT 02 Thermocatalytic Processing of Plastic Wastes and Biomass into Advanced Fuels and Chemicals
 D. P. Serrano (11:50 - 12:20)
 CT 04 Carbon Nanotubes and Hydrogen From Pyrolysis-Gasification of Waste Plastics
 J. C. Acomb, C. Wu, P. T. Williams (12:20 - 12:35)
 CT 05 On the Molecular Mass of Pyrolysis Oils from Polyolefins
 M. Brebu, I. Bunia, M. Silion, K. Murata (12:35 - 12:50)
 CT 06 Plasma Pyrolysis for Recovery of Energy from Plastic waste
 B. Ruj, P. K. Chatterjee, A. K. Goel (12:50- 13:05)
 13:05 - 14:00 Lunch Break
 14:00 - 16:10 Technical Session III: Plastics Conversion
 PT 03 Feedstock Recycling Situation in Japan and its Future View
 T. Yoshioka (14:00 -14:30)
 IT 03 Plastic Waste Management in Japan
 H. Ida, O. Sakaguchi (14:30 -14:55)
 CT 07 Review of Post-Consumer Plastic Preparation in Austria and New Approaches for Feedstock Recycling
 M. Bauer, M. Lehner (14:55 - 15:10)
 CT 08 Utilization of Plastic Wastes for Synthesis of Carbon
 Microspheres: A Template for Nano-crystalline Copper (II) Oxide
 Hollow Spheres
 S. Y. Sawant, R. S. Somani, S. S. Sharma, H. C. Bajaj (15:10 - 15:25)
 CT 09 Temperature Dependent Pyrolytic Product Evolution Profile for
 Binary Mixtures of Low Density Polyethylene and Poly(ethylene
 terephthalate)
 U. Hujuri, A. K. Ghoshal, S. Gumma (15:25 - 15:40)
 CT 10 Recovery of Phenols from Bisphenol A Polycarbonate in the
 Presence of MgO
 G. Grause, R. Kaerbrant, T. Kameda, T. Yoshioka (15:40 - 15:55)
 CT 11 Emissions from the Pyrolysis and Combustion of Different
 Wastes
 N. Ortuño, J. A. Conesa, J. Moltó, R. Font (15:55 - 16:10)
 16:10 - 16:30 Tea Break
 16:30 - 17:55 Inaugural Program
 18:00 onwards Welcome Dinner

24th October, Thursday

8:30 Onwards Registration
 8:55 - 9:00 Welcome Remarks
 9:00 - 10:40 Technical Session IV: Plastics Conversion



Inaugural program の様子

写真中央 : Shri S. Jaipal Reddy 氏 (Hon'ble
 Minister Science & Technology and Earth
 Sciences, Govt. of India) , 一番左 : FSRJ
 多賀谷会長

IT 04 Gas Production by Steam Gasification of Polypropylene/Biomass Waste Composites in a Dual-bed Reactor
Md. Azhar Uddin, T. Watanabe, Y. Kato, E. Parparita, C. Vasile, J. Yanik (9:00 - 9:25)

CT 12 Air Gasification of Mixed Plastic Wastes in a Two-stage Gasifier using Olivine and Activated Carbon for the Production of a Low-tar and Hydrogen-rich Producer Gas
M. H. Cho, Y. G. Choi, J. S. Kim (9:25 - 9:40)

CT 13 Speciality Products from Chemical Recycling of Pre-consumer Plastic Wastes
M. Sahai, H.U. Khan, A. Kumar, G. D. Thakre, S. Kaul, S. M. Nanoti, M. O. Garg, S. Kumar (9:40 – 9:55)

CT 14 Pt/ITQ-6 Zeolite as a Bifunctional Catalyst for Hydrocracking of Plastic Wastes
E. Fuentes, J. A. Salbidegoitia, M. P. González-Marcos, J. L. Ayastuy, J. R. González-Velasco (9:55 - 10:10)

CT 15 Conversion of Waste PET into Important Chemicals Using Amines
M. N. Siddiqui, H. H. Redhwi (10:10 - 10:25)

CT 16 How to Enhance the Quality of the Recycled Polystyrene Wastes?
C. Gutiérrez, M. T. García, I. Gracia, A. de Lucas, J. F. Rodríguez (10:25 - 10:40)

10:40 - 10:55 Tea Break

10:55 - 13:05 Technical Session V: Plastics Conversion

IT 05 Pyrolytic Decomposition Kinetics of Plastic Wastes
A. K. Ghoshal (10:55 -11:20)

CT 17 Conversion of LDPE Towards Transportation Fuels by a Two-stage Process Using Ni/Al-SBA-15 as Catalyst
D. P. Serrano, J. M. Escola, M. Arroyo, A. Alba (11:20 - 11:35)

CT 18 Effectively Terminal Functionalisation of Precise Products Obtained by Controlled Thermal Degradation of Polypropylenes
D. Sasaki, Y. Yoshihiro, T. Hoshi, T. Hagiwara, T. Sawaguchi (11:35 - 11:50)

CT 19 Carbonization of Polyester and Cotton Cloth for Production of the Gas with High Hydrogen Content
O. Dudnyk, A. K. Sinha, B. Singh, P. Stryzhak, A. Trypolsky, S. A. Farooqui, I. Sokolovska (11:50 - 12:05)

CT 20 Sequential Pyrolysis and Catalytic Reforming of Municipal Plastic Waste in a Pilot Scale Reactor
M. Syamsiro, H. Saptoadi, S. Cheng, K. Yoshikawa (12:05 - 12:20)

CT 21 Mechanical Properties of Fly ash Filler in Natural Fiber-hybrid Epoxy Composites
G. Raghavendra, S. K. Acharyar, S. K. Pal, S. Ojha (12:20 - 12:35)

CT 22 Evaluation of the Dehydrochlorination of Polyvinyl Chloride in Steam Atmosphere
J. D. Fonseca, G. Grause, T. Kameda, T. Yoshioka (12:35 - 12:50)

CT 23 In-situ Decreasing of Contaminants in Products of Agricultural Plastic Waste Pyrolysis
N. Miskolczi, N. Borsodi, L. Bartha (12:50 - 13:05)

13:05 - 14:00 Lunch

14:00 - 15:15 Poster Session

15:15 - 15:30 Tea Break

15:30 - 17:50 Technical Session VI: Biomass Conversion

PT 04 The Role of Porous Materials as Catalysts for the Conversion of Lignocellulosic Biomass to Biofuels, Hybrid fuels and Chemicals
M. Stöcker (15:30 - 16:00)

IT 06 Valorization of Waste Biomass Feedstock for Paper Industry – A Holistic Approach
D. K. Adhikari, D. Ghosh, D. Agrawal, S. Kaul, R. K. Jain, D. Dasgupta, S. K. Suman, Rashmi (16:00 – 16:25)

IT 07 Generation of Clean and Distributed Energy From Biomass
R. Kumar (16:25 – 16:50)

CT 24 Pyrolysis of Wood-, Cellulose-, Lignin-PVC Mixtures
Zs. Czégény, E. Jakab, M. Blazsó (16:50 – 17:05)

CT 25 Catalytic Cracking of Jatropa- Derived Fast Pyrolysis Oil using FCC E-Catalyst
D. V. Naik, T. Bhaskar, N. Athiya, K. K. Singh, A. Kumar, M. K. Poddar, B. Bhavya, D. K. Adhikari, M. O. Garg (17:05 – 17:20)

CT 26 Conversion of Lignocelluloses using Solid Catalysts
P. L. Dhepe, A. K. Deepa, P. Bhaumik, T. Kane (17:20 – 17:35)

CT 27 Monolayer Protected Platinum Nanoparticles as Heterogeneous Catalyst for Organic Transformations

R. Nagarkar, A. Ahire, A. Ghosh, S. Dapurkar, K. S. Nagabhushana,
N. K. Mal, R. Kumar (17:35 – 17:50)

18:00 Onwards Cultural Program and Conference Dinner

25th October, Friday

8:30 Onwards Registration

8:55 – 9:00 Welcome Remarks

9:00 – 11:15 Technical Session VII: Biomass Conversion

PT 05 Alternative Heating Oil From Wood Residues – VTT'S
EXPERIENCES

A. Oasmaa, Y. Solantausta, J. Lehto (9:00 – 9:30)

CT 28 Fundamental Understanding of Co-(Fast)-Pyrolysis of
Biomass and Polymers for Energy and Resource Recovery

T. Ray, R. Vinu (9:30 – 9:45)

CT 29 Effect of Pressure and Temperature on the Hydrolysis of
Cotton Residue

B. Balagurumurthy, R. Singh, T. S. Oza, T. Bhaskar (9:45 – 10:00)

CT 30 Production of Bioplastics from Biological Wastewater Treatment: A Sustainable Approach

M. V. Reddy, K. Amulya, M. V. Rohit, S. V. Mohan (10:00 – 10:15)

CT 31 Prospects of 2, 5-Dimethylfuran as a Fuel: Physico-chemical and Engine Performance Characteristics Evaluation

M. K. Shukla, I. Singh, N. Singh, S. Singhal (10:15 – 10:30)

CT 32 Industrial Waste as Feedstock for Biofuel and Biomaterial Production

N. D. Choudhury, R. S. Chutia, R. Kataki (10:30 – 10:45)

CT 33 Vapour-Phase Hydrogenolysis of Glycerol over Nanostructured Ru/HAP Catalysts

V. P. Kumar, M. H. Shekar, G. Sailaja, B. Putrakumar, K. V. R. Chary (10:45 – 11:00)

CT 34 Hydrothermal Liquefaction of Agricultural and Forest Biomass Residue: Comparative Study

R. Singh, B. Balagurumurthy, A. Prakash, T. Bhaskar (11:00 – 11:15)

11:15 – 11:30 Tea Break

11:30 – 12:45 Brain-storming Session

Chairman: Prof. S. K. Brahmachari, DG-CSIR & Secretary, DSIR

Panelists:

PL 01 Prof. A. Buekens, Vrije University, Belgium

PL 02 Dr. M. O. Garg, CSIR-Indian Institute of Petroleum, India

PL 03 Prof. A. K. Ghosh, Indian Institute of Technology-Delhi,
India

PL 04 Prof. A. Oku, Kyoto Institute of Technology, Japan

PL 05 Prof. Y. Sakata, Okayama University, Japan

PL 06 Prof. D. P. Serrano, IMDEA, Spain

PL 07 Prof. M. Stöcker, SINTEF, Norway

PL 08 Dr. T. Kamo, AIST, Japan

12:45 - 13:45 Lunch Break

13:45 - 15:35 Technical Session VIII: Solvolysis

IT 08 Distribution Kinetics for Polymer Degradation

G. Madras (13:45 - 14:10)

IT 09 Chemical Production from Biomass and Organic Wastes
with High-temperature Water for Sustainable Chemicals
Production System

M. Shirai (14:10 - 14:35)

CT 35 Reaction Pathway Analysis and Kinetics on the Solvothermal Degradation of Epoxy Resins in Carbon Fiber Reinforced
Plastics



Cultural program の様子



Brain-storming session

M. Sasaki, J. Terada, F. Kawase, K. Shibata, A. T. Quitain (14:35 - 14:50)

CT 36 Preliminary Experiments for the Recycling of Polyurethane Foams in Supercritical CO₂

J. F. Rodriguez, D. Simón, A. D. Lucas, A. M. Borreguero (14:50 - 15:05)

CT 37 Depolymerization of Polymers in Ionic Liquids

A. Kamimura, S. Yamamoto, T. Okagawa, T. Otsuka, M. Yoshimoto (15:05 - 15:20)

CT 38 Development of an Upscalable Recycling Process for Polyolefins and other Post-Consumer Plastic Fractions via Solvent-based Depolymerization

C. Lederer, M. Lehner (15:20 - 15:35)

15:35 - 15:50 Tea Break

15:50 - 17:20 Technical Session IX: Voice of the Industry

IST 01 S. Ray, Reliance Industries, India

IST 02 H. Ida, PWMI, Japan

IST 03 A. Chaturvedi, GIZ, GmbH, India

IST 04 V. Merchant, ICPE, India

IST 05 T. Yoshioka, Tohoku University, Japan

IST 06 N. Ravichander, SABIC, India

IST 07 H. Rajora, HPCL-Mittal Energy, India

IST 08 A. Jha, Ramky Environment, India

17:20 - 18:00 Valedictory Ceremony

18:00 - 18:30 High Tea

26th October, Saturday

Symposium Tour to Agra



Poster 賞授賞式の様子



Agra ツアーの 1 コマ