The 33rd Annual Saudi- Japan Symposium



Outline :

The 33rd Annual Saudi- Japan Symposium was held on February 10th and 11th, 2025, at KFUPM Dhahran Techno Valley in Saudi Arabia, jointly hosted by Saudi Aramco, KFUPM, JCCP, and the Japan Petroleum Institute (JPI). On the first day, opening remarks were given by Dr. Mohammad Al-Saggaf, President of KFUPM, Dr. Faisal Al-Otaibi, Director, Research and Development Center of Saudi Aramco, Chief Technology Officer, Senior Executive Director, JCCP Mr. Masuda, and Dr. Katada, JPI Vice President/Professor of Tottori University. The symposium was a great success, with over 170 researchers, students, and representatives of local Japanese companies in attendance. The theme of the symposium was "Technology in Fuels & Petrochemicals: Advancing Sustainable Solutions," and 20 presenters (5 of which were from Japan) were given on the fields of energy conservation, application of AI and machine learning, petrochemistry, and sustainable energy. There was also a poster session with 30 presentations, and lively question and answer sessions were held along with the lectures. In 2025, Japan and the Kingdom of Saudi Arabia marks the 70th anniversary of the establishment of diplomatic relations, and this event has been certified by the Ministry of Foreign Affairs as an anniversary event.

The 33rd Annual Saudi- Japan Symposium Summary

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Dr. Mohammad Al-Saggaf, President of KFUPM



Mr. Masuda, Chief Technology Officer, Senior Executive Director, JCCP



The audience



Dr. Faisal Al-Otaibi, Director, Research and Development Center of Saudi Aramco



Dr. Katada, JPI Vice President/Professor of Tottori University



- **9:30 2. Catalytic transformation of LDPE into fuel oil enriched with aromatic hydrocarbons**; *Dr. Muhammad Akthar, CRAC, KFUPM*
- **9:50 3. Pyrolysis oil upgrading to aromatics**; *Dr. Miao Sun, Saudi Aramco*
- 10:10 Coffee break

SESSION TWO SUSTAINABLE SOLUTIONS

- **10:40 4. Recycling of waste plastics without consumption of other materials: Shape selective cracking of polyolefin on H-MFI zeolite catalysts with recovery of cyclooctane solvent**; *Prof. Naonobu Katada, Tottori University*
- **11:00 5. Kinetic influence of Ba on cobalt-catalyzed ammonia decomposition reaction**; *Dr. Zahra Almisbaa, Saudi Aramco*
- **11:20 6. Sustainable passive solutions for reduced energy use in cooling applications**; *Dr. Issam Gereige, Saudi Aramco*
- 11:40 Prayer & Lunch Break

SESSION THREE NEW CHALLENGES: PROCESSES/FUELS Chairman: Dr. Faisal Alshafei, Saudi Aramco

- 13:007.Sustainability without borders: Advancing partnerships between the Kingdom of Saudi
Arabia and Japan; Eng. Zainab Nasif and Ms. Ahaad Turki, OSP
- **13:30** 8. North American market research: Energy transition to renewables from policies and technologies; *Dr. Satoshi Ogano, JPI*
- **13:50 9.** Ultrasonically enhanced oxidative desulfurization of heavy fuel oil: Pilot scale test results and techno-economics assessment; *Dr. Shekhar Kulkarni, KAUST*
- **14:10 10.** Catalysis reinvented: Sustainable materials and ultrafast laser insights for economic and environmental advancement; *Dr. Ahmed El-Zohry; CIPR, KFUPM*

14:35 - 15:50 Poster Session One (See Page 3)

Chairman: Dr. Shakeel Ahmed, KFUPM



Technology in Fuels & Petrochemicals Advancing Sustainable Solutions

Day Two: Tuesday, February 11, 2025

SESSION FOUR ADVANCED CATALYST TECHNOLOGIES Chairman: Dr. Naonobu Katada, JPI

- **08:30 11.** Keynote: Accelerated discovery of heterogeneous catalysts using machine learning; Dr. Takashi Toyao, Hokkaido University
- **09:00 12.** Mechanochemical route to synthesize zeolites as novel method and their characterization with XAFS; Emeritus Prof. Atsushi Muramatsu, Tohoku University
- 09:20 13. Catalytic cracking technology for VGO application; Ms. Maryam Taher, Saudi Aramco
- 09:40 Coffee Break

SESSION FIVE SUSTAINABLE CHEMICALS

Chairman: Dr. Ziyauddin Qureshi, KFUPM

- **10:10 14.** Keynote: Rational design of heterogeneous catalyst for the production of sustainable chemicals; *Dr. Javier Martinez, KAUST*
- **10:40 15.** Synergistic effects of S-C₃N₄ on cobalt ferrite catalysts for oxygen evolution reaction and enhanced electrochemical conversion of biomass derived 5-hydroxy-methylfurfural into 2,5-furandicarboxylic acid; *Dr. Wasif Farooq, CHE, KFUPM*
- **11:00 16. Tuning the properties of ZSM-5 additive for co-cracking of waste plastics dissolved in vacuum gas oil**; *Dr. Abdulkadir Tanimu, CRAC, KFUPM*
- **11:20 17. Catalytic microwave assisted pyrolysis of waste plastics**; *Dr. Abdul Gani Abdul Jameel, CHE, KFUPM*
- 11:40 Prayer & Lunch Break
- 13:00 14:15 Poster Session Two (See Page 4)

SESSION SIX CO₂ CAPTUR AND CONVERSION Chairman: Dr. Rashed Aleisa, Saudi Aramco

- **14:20 18.** Keynote: Hydrogenation of CO₂ for carbon neutrality: Enhancing efficiency with membrane reactors; *Prof. Masahiko Matsukata, Waseda University*
- **14:50 19. Steering electrochemical CO**₂ **reduction toward liquid fuels and chemicals**; *Mr. Husain Naji, Saudi Aramco*
- **15:10 20. Development of highly dispersed Pd nanoparticles supported on dendritic mesoporous heterogeneous catalyst for efficient CO**₂ **hydrogenation to methanol**; *Dr. Mohnnad Alabsi, Saudi Aramco*
- **15:30** *Closing Remarks, Symposium Ends Dr. Wael Fouad, CRAC, KFUPM*

Each presentation includes 5-minutes Q&A

33rd Annual Saudi-Japan Symposium – 2025







Technology in Fuels & Petrochemicals

Advancing Sustainable Solutions

POSTER SESSION ONE: MONDAY, FEBRUARY 10, 2025

Coordinator: Dr. Jaseer EA, KFUPM

- **14:35** P1. Post-synthesis functionalization of covalent organic framework for CO₂ capture from DAC; Mona Al-Otaibi, Saudi Aramco
- **14:40 P2. DFT study of CO₂ hydrogenation over alumina-based catalysts via RWGS reaction**; *Abdulrahman Yassin, Saudi Aramco*
- **14:45 P3.** Enhancing hydrogen production: Acidic-basic structural modification of nickel-based catalysts for ammonia decomposition; *Reem Albashrawi, Saudi Aramco*
- 14:50 P4. Electrochemical ammonia decomposition over nickel and cobalt nanostructures on nickel foam for sustainable hydrogen production; Umar Jafar, Mustapha Umar, Yahaya Gambo, Khalid Alhooshani, Yousef Alsunni, CHEM, CHE, CRAC, KFUPM
- **14:55 P5.** Maximizing CO production from CO₂ conversion for e-fuels: Reverse water-gas shift reaction; *Emad Al-Shafei, Saudi Aramco*
- **15:00 P6. Quantitative risk assessment of hydrogen refueling stations: A case study for Saudi Arabia**; *Bashir Hashim, Sunhwa Park, CHE, CRAC, KFUPM*
- **15:05 P7.** Selecting hydrogen storage in Saudi Arabia: A multi-criteria framework integrating FAHP for uncertainty and safety; *YooJeong Oh, Hans Pasman, Safyan Khan, Sunhwa Park, CHE, CRAC, CHTC, KFUPM, Texas A&M USA*
- **15:10 P8.** Exploring the synergy between CoP and Co₂P phases: A comparative study of cobalt phosphides phases and their composite for hydrogen evolution reaction; *Wajiha Fatima, Tarek Kandiel, CHEM, CHTC, KFUPM*
- **15:15 P9.** Decorating Zr₁₂O₁₂ nanocage with transition metals (Ti, V, Cr, or Mn) to act as a single-atom catalyst for water splitting application; Sajjad Hussain, Abdulaziz Al-Saadi, CHEM, CRAC, KFUPM
- **15:20 P10. Production of hydrogen and value-added chemicals through microwave assisted pyrolysis (MAP) of Arabian Crude Oils**; *Intisar Ul Hassan, Aniz Ummer, Abdul Gani Abdul Jameel, CHE, CRAC, KFUPM*
- **15:25 P11. Dry reforming of methane to syngas using Ni/Al₂O₃ catalysts promoted by lanthanides**; *Imtiaz Ul Hasan, Zuhair Malaibari, Shakeel Ahmed, CHE, CRAC, KFUPM*
- **15:30 P12.** Catalytic performance in dry reforming of methane: A comparative study of SiO₂ encapsulated and unencapsulated Ni/Cao-Al₂O₃ catalysts; Sherif Alabi, Sagir Adamu, Abdallah Al-Shammari, Mohammad Hossain, CHE, CRAC, KFUPM
- **15:35 P13. Synthesis of ZSM-nonorods for low temperature CO**₂ **reforming of methane to syngas**; *Yahuza Abdulai, Ijaz Hussain, Khalid Alhooshani, Saheed Ganiyu, CHEM, CRAC, KFUPM*
- **15:40 P14. Case study on the acid sites formation and morphology in amorphous silica-alumina**; *Batool Altaher, Saudi Aramco*
- **15:45 P15. Exploring zeolite potential for hydrofluorocarbon capture and recycling: Insights from molecular simulations**; *Abrar Elhussien, Ismail Abdulazeez, Hassan Alasiri, Wael Fouad, CHE, CMWS, CRAC, KFUPM*



Technology in Fuels & Petrochemicals Advancing Sustainable Solutions

POSTER SESSION TWO: TUESDAY, FEBRUARY 11, 2025 Coordinator: Dr. Jaseer EA, KFUPM

- **13:00 P16.** A novel approach for the synthesis of carbon fiber from low-value heavy petroleum fractions; *Ajay Sharma, Mustafa Amin, Muhammad Siddiquee, CHE, CRAC, KFUPM*
- **13:05 P17. Gen2 hydrocracking catalyst development for thermal crude to chemicals**; *Lianhui Ding, Saudi Aramco*
- **13:10 P18. Hierarchical ZSM-11: A catalyst for converting crude oil into light olefins**; Muhammad Waqas, Ziyauddin Qureshi, CRAC, KFUPM
- **13:15 P19. Co-pyrolysis of microalgae and plastic waste into valuable products**; *Fatima AlRadhi, Ahmad Nawaz, Shahina Riaz, Shaikh Abdur Razzak, Omar Abdelaziz, CHE, CRAC, KFUPM*
- **13:20 P20. Experimental investigation of co-pyrolysis of plastic waste and biomass: Biofuel production and comprehensive characterization**; *Hayat Haddad, Ahmad Nawaz, Shaikh Abdul Razak, CHE, CRAC, KFUPM*
- **13:25 P21.** Conversion of polypropylene to chemicals in a reactive distillation system; Kagiso Bikane, Jingyang Bai, Marcos Millan, CHE, CRAC, KFUPM, ICL, UK
- **13:30 P22. Ensemble technique for predicting dehydrogenation products yield during** *n***-butane oxidative dehydrogenation;** *Gazali Tanimu, Jimoh Ajadi, Hassan Alasiri; CRAC, CHE, MATH, KFUPM*
- **13:35 P23. Rational design of N-aryl PNP ligands for controlling product profiles in Cr-catalyzed ethylene oligomerization**; *Abdulrahman Musa, E. A. Jaseer, Samir Barman, Nestor Garcia, Mohamed Elanany; Motaz Khawaji, CRAC, CHEM, KFUPM, Saudi Aramco*
- **13:40 P24. Mesoporosity engineering in zeolites for enhanced catalytic performance: Post-synthesis modification and adsorption study**; *Nida Tasneem, Hassan Alasiri, Shakeel Ahmed, CHE, CRAC, KFUPM*
- 13:45 P25. A lumped kinetic model for hydro-dearylation process; Qi Xu, Saudi Aramco
- 13:50 P26. Development of tin-containing mesoporous silica catalysts for Baeyer-Villager oxidation of cyclic ketones; Mashail Al-Qahtani, Saudi Aramco
- **13:55 P27. Efficient synthesis of dimethyl carbonate from CO**₂ **using cerium oxide-based catalysts**; *Niladri Maity, CRAC, KFUPM*
- 14:00 P28. Single-step electrochemical conversion of CO₂ to C₄ products with Cu based catalyst unveiling mechanisms through DFT and in situ Raman spectroscopy; Esraa Kotob, Khalid Alhooshani, Saheed Ganiyu, CHEM, CRAC, KFUPM
- 14:05 P29. Synergistic role of La and Ni species on CeO₂ decorated SiO₂ catalyst for enhanced CO₂ conversion to synthetic natural gas (SNG); *Ijaz Hussain, Saheed Ganiyu, Khalid Alhooshani, CHEM, CRAC, KFUPM*
- 14:10 P30. Carbon nitride modified highly reduced graphene composite as a potential material for CO₂ utilization: insights from first-principle DFT calculations; Abdulraheem Bello, Abdulaziz Al-Saadi, CHEM, CRAC, KFUPM