

第32回日本サウジアラビア合同シンポジウム

2023年12月5、6日の両日、サウジアラビア KFUPM Dhahran Techno Valley において、Saudi Aramco、KFUPM、JCCP、公益社団法人石油学会（JPI）の4社共催で「第32回日本サウジアラビア合同シンポジウム」を開催しました。

初日のオープニングでは KFUPM Dr. Ali Ahmad Al-Shaikhi 副総長*1、Saudi Aramco Dr. Ali A. Al-Meshari SVP、JCCP 増田特別参与、並びに JPI 村松会長/東北大学教授が挨拶を行い、JPI 村松会長/東北大学教授は併せてキーノートスピーチも行いました。130名を超える研究者や学生、現地日系企業からの出席を得て盛大なシンポジウムとなりました。

シンポジウムのテーマは「石油精製および石油化学技術」(Technology in Petroleum Refining & Petrochemicals) で、省エネ、AI や機械学習の適用、石油化学、持続可能エネルギーを分野に、女性による3講演を含め22件（内、日本からオンライン2件を含め6件）の講演が行われました。またポスターセッションも実施され、日本から1名参加を含み若手研究者による24件の発表があり、講演とともに活発な質疑応答等が交わされました。

*1. Dr. Muhammad M. Al-Saggaf, President代理



32nd Annual Saudi-Japan Symposium – 2023



Technology in Fuels & Petrochemicals

Innovative Catalyst Development

Venue: KFUPM Dhahran Techno Valley, Innovation Cluster Bldg., Auditorium 1-111
December 5-6, 2023

Day One: Tuesday, December 5, 2023

OPENING REMARKS SESSION

Chairman: Dr. Wael Fouad, KFUPM

8:30 Opening Remarks

- Dr. Muhammad M. Al-Saggaf, President, KFUPM
- Mr. Hitoshi Masuda, Special Counselor, JCCP
- Dr. Ali A. Al-Meshari, Senior Vice President, TOC, Saudi Aramco
- Dr. Atsushi Muramatsu, President, JPI

SESSION ONE PETROLEUM CONVERSION

Chairman: Dr. Mohammad Al-Abdullah, Saudi Aramco

- 9:00 1. **Keynote: JPI direction along carbon neutrality and introduction of our research, direct methane conversion over zeolite catalysts;** Dr. Atsushi Muramatsu, President of JPI, Deputy Director (Soft Materials), Tohoku University, Japan
- 9:30 2. **Atmospheric impact of fugitive CH₄ and H₂;** Dr. Theis Solling, Center for Integrated Petroleum Research, CIPR, KFUPM
- 9:50 3. **Crude to chemicals – old challenges and new opportunities;** Dr. Lujain R. Alfilfil, Saudi Aramco R&DC

10:10 Coffee break

SESSION TWO AI AND ML APPLICATIONS

Chairman: Dr. Hassan Aljama, Saudi Aramco

- 10:40 4. **Application of ML to predict performance of oxidative dehydrogenation catalysts;** Dr. Gazali Tanimu, Center for Refining & Advanced Chemicals (CRAC), KFUPM
- 11:00 5. **Accelerating catalyst discovery using extrapolative ML approach;** Dr. Takashi Toyao, Institute for Catalysis, Hokkaido University, Japan
- 11:20 6. **AI and data-driven optimization of one-step crude to chemicals process;** Ms Noor Sulais, R&DC, Saudi Aramco

11:40 Prayer & Lunch Break

SESSION THREE PETROCHEMICALS-1

Chairman: Dr. Zuhair Malaibari, KFUPM

- 13:00 7. **Distillate hydrocracking catalyst and process to produce isomerate and steam feedstock;** Dr. Ashok K. Punetha, Saudi Aramco
- 13:20 8. **Molecular kinetic model development and parameter estimation for naphtha reforming;** Dr. Syed A. Ali, CRAC, KFUPM

POSTER SESSION

**Coordinator: Dr. Rajesh Theravalappil,
KFUPM**

- 13:45 P1. **2-Pentene cracking over bifunctional MFI-type zeolites**; *Mr. Mohammed Alkhunaizi, R&DC, Saudi Aramco*
- 13:50 P2. **Post-Synthesis Functionalization of Covalent Organic Frameworks for Carbon Dioxide Capture from Air (DAC)**; *Mrs. Mona Al-Otaibi, R&DC, Saudi Aramco*
- 13:55 P3. **Resilience of transalkylation catalyst towards industrial contaminants**; *Mr. Mosab T. Kheyami, R&DC, Saudi Aramco*
- 14:00 P4. **Polypropylene cracking proceeding in micropores of MFI type zeolite**; *Mr. Tomohiro Fukumasa, Center Research Green Sustainable Chemistry, Tottori University*
- 14:05 P5. **Towards sustainable CO₂ valorization: Harnessing Cu single atoms and nanoparticles**; *Ms. Esraa Kotob, CHEM, KFUPM*
- 14:10 P6. **Catalytic conversion of LDPE plastic via pyrolysis process**; *Mr. Feras Alqudayri, CRAC, KFUPM*
- 14:15 P7. **Thermocatalytic pyrolysis of microalgae biomass over Y-zeolite catalyst towards clean fuel and valuable chemicals**; *Ms. Hayat A. Haddad, CHE, KFUPM*
- 14:20 P8. **Effect of plastic composition on the synergetic interactions, kinetic and thermodynamic properties from the co-pyrolysis of date palm waste and waste foam**; *Dr. Ahmad Nawaz, CHE, KFUPM*
- 14:25 P9. **Enhanced selectivity of benzene-toluene-ethyl benzene and xylene in direct conversion of n-butanol to aromatics over Zn-HZSM-5 catalysts**; *Dr. Tatinaidu Kella, CRAC, KFUPM*
- 14:30 P10. **Chemical modification and characterization of cellulose acetate**; *Dr. Abdulrahman Musa, CRAC, KFUPM*
- 14:35 P11. **Role of naphthenic-aromatic hydrocarbon in autoxidation of heavy vacuum gas oil for carbon fiber precursors**; *Mr. Mustafa M. Amin, CHE, KFUPM*
- 14:40 P12. **Methanol synthesis from CO₂ hydrogenation process: from catalyst design to technology Development**; *Dr. Nagendra Kulal, CRAC, KFUPM*
- 14:45 P13. **Well-designed glucose precursor carbon/g-C₃N₄ nanocomposite for enhanced photocatalytic CO₂ conversion to fuels**; *Dr. Abdullah Bafaqeer, CRAC, KFUPM*
- 14:50 P14. **TiO₂ based photocatalyst for solar hydrogen production from water**; *Dr. Muhammad Waqas, CRAC, KFUPM*
- 14:55 P15. **Highly efficient Ni/SiO₂-MgO catalyst for CO₂ methanation in synthetic natural gas production: Thermodynamics and catalytic insights**; *Dr. Ijaz Hussain, CRAC, KFUPM*
- 15:00 P16. **Enhancing the efficiency of Ti₂C MXene electrocatalyst via zinc oxide nanorod intercalation for CO₂ electrochemical conversion to methane selectively**; *Mr. Abdulalhi Abdulhakam, CHEM, KFUPM*
- 15:05 P17. **Dual activity of zinc oxide-MXene nanocomposite for enhancing the electrochemical conversion of CO₂ to Value-added Product**; *Mr. Abdulalhi Abdulhakam, CHEM, KFUPM*
- 15:10 P18. **Highly efficient fibrous silica lanthanum oxide-supported nickel catalyst for dry reforming of methane**; *Mr. Mohammed Awad, CHEM, KFUPM*
- 15:15 P19. **Controlled synthesis of zinc layered double hydroxides for superior electrochemical CO₂ reduction**; *Mr. Omer Taialla, CHEM, KFUPM*
- 15:20 P20. **Spent FCC catalyst in pesticides microextraction a sustainable approach towards waste recycling/reuse**; *Ms Shaima' Alsabbahen, CHEM, KFUPM*
- 15:25 P21. **Turning waste in to value: K-promoted red mud as an effective catalyst for CO₂ hydrogenation to olefins**; *Ms Mahbuba Aktary, MSE/IRC-HES, KFUPM*
- 15:30 P22. **Production of dimethyl carbonate from CO₂ by using cerium oxide-based catalyst**; *Mr. Mohammed Alqarni, CRAC, KFUPM*
- 15:35 P23. **Molecular dynamics simulation of refrigerant separation using zeolite: A comprehensive study on adsorption**; *Ms. Abrar A. Elhusein, CHE, KFUPM*

15:40 Poster Session Ends

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Technology in Fuels & Petrochemicals

Innovative Catalyst Development

Day Two: Wednesday, December 6, 2023

SESSION FOUR PETROCHEMICALS-2

Chairman: Dr. Takashi Toyao, Hokkaido University

- 8:30 9. Effect of gallium and platinum distribution encapsulated in silicalite-1 (MFI) zeolite on controlled propane dehydrogenation reaction; Mr. Fadhil A. Almukhtar, Saudi Aramco R&DC
- 8:50 10. Highly efficient dehydrogenation of isopentane to isoprene: Selectivity control of the catalytic reaction field by electric internal heating system; Dr. Ryo Watanabe, Shizuoka University, Japan
- 9:10 11. Insights on CO₂-mediated oxidative dehydrogenation of propane: Aspen plus simulation and in situ DRIFT experiment; Dr. Yahya Gambo, CRAC, KFUPM
- 9:30 12. Light olefins cracking by zeolites prepared from refinery waste; Mr. Mohammad Rebh, Saudi Aramco R&DC
- 9:50 **Coffee Break**

SESSION FIVE SUSTAINABILITY-1

Chairman: Dr. Saheed Ganiyu, KFUPM

- 10:20 13. CO₂ hydrogenation to carbon-neutral liquid fuels by powerful catalyst; Dr. Noritatsu Tsubaki, University of Toyama, Japan (*Online Lecturer*)
- 10:40 14. CO₂ hydrogenation to lower olefins using iron supported catalysts; Dr. M. Nasiruzzaman Shaikh, Center for Hydrogen & Energy Storage, KFUPM
- 11:00 15. Insights into plastic pyrolysis and bio-oil upgrading: process optimization and techno-economic analysis; Dr. Omar Abdelaziz, CHE, KFUPM
- 11:20 16. Selective aromatics recovery by catalytic conversion of pyrolysis gas from carbon fiber reinforced plastic; Dr. Kazumasa Oshima, Kyushu University, Japan
- 11:40 17. Challenges and opportunities in converting waste plastic into value-added products; Dr. Mohammad Nahid Siddiqui, CHEM, KFUPM
- 12:00 **Prayer & Lunch Break**

SESSION SIX SUSTAINABILITY-2

Chairman: Dr. Kazumasa Oshima, Kyushu University

- 13:00 18. Challenge of green hydrogen production from air by direct air electrolysis; Dr. Etsushi Tsuji, Tottori University, Japan (*Online Lecturer*)
- 13:20 19. Adjusting the crude oil-to-chemical process using unconventional reactors and catalyst Formulations, Dr. Pedro Castano, KAUST Catalysis Center, KAUST
- 13:40 20. Fueling future aviation with CO₂ to jet technology; Mr. Arthur Foutsitzis, Honeywell UOP, KSA
- 14:00 21. 3D porous polymers for selective removal of CO₂ and H₂ storage; Dr. Othman Al Hamouz, Chemistry Department, KFUPM
- 14:20 22. Metal-organic frameworks functionalization and design strategies for CO₂ capture; Ms. Nawal M. Alghoraibi, R&DC, Saudi Aramco
- 14:40 **Closing Remarks, Symposium Ends**
Dr. Wael Fouad, CRAC, KFUPM

Each presentation includes 5-minutes Q&A

Symposium supported by: 