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CATALYTIC ADVANCES PROGRAM (CAP) R&D REPORTS

2026

Catalytic CO₂ Conversion: Pathways to Olefins and Aromatics

AUTHORS: Dr. Mohammad Ghith Al Shaal and Dr. Lukas Buelens

PEER REVIEWERS: Prof. Matteo Cargnello and Prof. Siglinda Perathoner

Challenges and Opportunities in Biofuel Commercialization

AUTHOR: Dr. Paco Laveille and Prof. Adam Lee

PEER REVIEWERS: Prof. Nikolaos C. Kokkinos and Dr. Woody Shiflet

Catalytic Solutions for Biobased Chemicals and Next-Gen Monomers

AUTHOR: Dr. Leoncio Santiago-Martinez and Dr. Madeline Karod

PEER REVIEWERS: Prof. Paul Dauenhauer and Prof. Thomas Schwartz

2025

Advances in Catalysts for Value Addition of Waste Polymers and Biomass

AUTHORS: James Clark and Ugochukwu Patrick Okoye

PEER REVIEWERS: Rabya Aslam and Chinenye Adaobi Igwegbe

Catalyst Deactivation Related to Processing New Feedstocks

AUTHOR: Samuel Lalthazuala Rokhum

PEER REVIEWERS: Dr. Zaidoon Mohsin Shako and Prof. Gabrielle Centi

Membrane Reactors for e-Fuel Production via CO₂ Hydrogenation

AUTHOR: Fausto Gallucci

PEER REVIEWERS: Dr. John Wind and Dr. Bhupender Minhas

2024

Advances in CO₂ Activation Catalysts

AUTHORS: Taye Beyene Demissie, Salvatore Abate, Ramato Ashu Tufa

PEER REVIEWERS: Thomas Wirth, Hemant Choudhary

Advances in Catalysts for Biofuels and e-Fuels

AUTHORS: Samuel Lalthazuala Rokhum, Siglinda Perathoner

PEER REVIEWERS: Thomas Degnan, Dr. Woody Shiflett

Advances in Catalysis for Polyolefin Production

AUTHORS: Clifford Lee

PEER REVIEWERS: Jayant Divey, Luyi Sun

2023

Catalysts and Catalyst Manufacturing Methods for Decarbonization

AUTHORS: Prof. Gabrielle Centi, Dr. Woody Shiflett, Giuliano Giambastiani, Tade Oyewunmi

PEER REVIEWERS: Prof. Feng Jiao, Thomas Degnan

Startups in Catalysis and Catalytic Processes

AUTHORS: Olivier Messenger

PEER REVIEWERS: Robert Weber, Terry Helton

Advances in Materials for Catalysis

AUTHORS: Francesco Parrino, Leonardo Palmisano, Vincenzo Vaiano

PEER REVIEWERS: Abhaya Datye, Klaus Köhler

2022

Advances in Catalytic Science for the Upgrading, Conversion, and Co-Processing of Circular Feedstocks

AUTHOR: Dr. Devy Kartika Ratnasari, Prof. James Clark and Prof. Fergal Byrne

PEER REVIEWERS: Prof. Karen Wilson, Prof. Damien Debecker

Electrification of Catalytic Processes

AUTHORS: Prof. Evgeny Rebrov, Prof. Vincenzo Spallina, and Dr. Syed Zaheer Abbas

PEER REVIEWERS: Prof. Kevin Van Geem and Prof. Thomas Van Gerven

Catalysts and Materials to Address the Energy Transition: Fuel Cells, Batteries, and Energy Storage

AUTHORS: Prof. Ram Gupta, Prof. Anuj Kumar, and Prof. Carlo Giorgio Viconti

PEER REVIEWERS: Prof. Nirala Sing, Prof. Doug Ivey, and Dr. Chalachew Asmelash

2021

Advances in Catalysis for Plastic Conversion to Hydrocarbons

AUTHOR: Drs. Dureem Munir and Rabya Aslam

PEER REVIEWERS: George Manos, Thallada Bhaskar

Advances in Non-noble-metal Catalysts for Reforming and Conversion of Hydrocarbons

AUTHORS: Dmitry Murzin, Irina Simakova, Päivi Mäki-Arvela

PEER REVIEWERS: Kevin Van Geem, David Farrusseng

Electrocatalytic Approaches to Traditional Thermochemical Processes (including Hydrogen)

AUTHORS: Prof. Siglinda Perathoner

PEER REVIEWERS: Profs. Yujie Sun and Bryan Goldsmith

2020

Catalysts, Catalytic Processes, and Materials for Renewable Energy Production and Storage

AUTHOR: Profs. Siglinda Perathoner, and José Ramón Galán-Mascarós

PEER REVIEWER: John Wind

Advances in Digitalization of Catalysis; How IR4.0 is Revolutionizing the Way We Go About Catalysis

AUTHORS: Drs. Paige Marie Morse, Stephan Andreas Schunk, Christian Schulz, Andreas Sundermann, and David B. Morse

PEER REVIEWER: Gadi Rothenberg

Novel Potential Catalysts for Oil to Chemicals Conversion

AUTHORS: Prof. Avelino Corma, Yannick Mathieu, Laurent Sauvanaud

PEER REVIEWERS: Carlos Carrero and Dr. Woodrow K. Shiflett

2019

Advances in Catalyst Supports II

AUTHOR: Dr. Margaret Fredricks, Dr. Carmen Haeßner, and Dr. Florian Boch

PEER REVIEWERS: Dr. Klaus Kohler, Dr. Philip Hughes, and Prof. Abhaya Datye

Circularity in Chemicals

AUTHORS: Profs. Gabriele Centi, Vladimir Beskoski, Adelina Voutchkova-Kostal, and David Serrano Granados

PEER REVIEWERS: Dr. John Warner, Dr. Robert Weber, and Dr. John Wind

Advances in Electrocatalysis and Photocatalysis for Chemicals Production

AUTHORS: Prof. Leonardo Palmisano, Prof. Christian Durante, Prof. Francesco Parrino

PEER REVIEWERS: Profs. Yujie Sun and Paulo Fornasiero

2018

Advances in Catalyst Synthesis and Characterization

AUTHORS: Profs. Gabriele Centi, Kerry Dooley and James Dorman

PEER REVIEWERS: Prof. Miguel Banares and Dr. Anne Gaffney

Advances in Catalyst Modeling and Simulation

AUTHOR: Prof. Dorota Rutkowska-Zbik

PEER REVIEWERS: Prof. Andreas Heyden and Dr. Sorab Vatcha

Catalytic Conversion of Syngas to Chemical Products III

AUTHORS: Profs. Angeliki Lemonidou and Eleni Heracleous

PEER REVIEWERS: Profs. James Spivey and Philippe Kalck

2017

Catalytic Process R&D Scale-Up II

AUTHORS: Profs. Raghunath Chaudhari and Patrick Mills

PEER REVIEWER: Dr. Cawas Cooper

Advances in Octane Enhancement

AUTHOR: Mr. Dan Fraenkel

PEER REVIEWERS: Dr. Domenico Sanfilippo and Mr. John Creighton

Advances in High-Throughput Screening Methodologies

AUTHORS: Prof. Joris Thybaut and Dr. Kenneth Toch

PEER REVIEWER: Prof. Dr. Thomas Degnan

2016

Advances in Olefin Co-monomer and Polyolefin Production

AUTHOR: Dr. Ken Sinclair

PEER REVIEWER: Brian Kneale

Advances in On-Purpose Technology for Mono- and Di-Olefins

AUTHORS: Prof. Angeliki Lemonidou and Eleni Heracleous

PEER REVIEWERS: Dr. Erling Rytter and Prof. Israel Wachs

Recent Progress in Zeolitic Membranes for Gas Separations and Catalysis

AUTHOR: Prof. King Lun Yeung

PEER REVIEWERS: Prof. Miguel Banares and Dr. Sorab Vatcha

2015

Advances in Aromatics Production

AUTHORS: Dr. Cawas Cooper, Prof. Abdullah Aitani and Dennis O'Brien

PEER REVIEWERS: Drs. Jim Butler and Vijay Bhise

Advances in Methanol to Products

AUTHOR: Dr. Gabriele Centi

PEER REVIEWERS: Dr. Ronald A. Sills and Prof. Dr. Martin Bertau

Advances in Refinery Cracking Catalysts and Processes II

AUTHORS: Ray Fletcher, Frits Dautzenburg, and James Speight

PEER REVIEWERS: Warren Letzsch and Phil Thiel

2014

Dehydrogenation and Oxidative Dehydrogenation II

AUTHORS: Dr. Domenico Sanfilippo, Dr. Stefano Rossini and Prof. José Luis G Fierro

PEER REVIEWERS: Drs. Miguel Bañares and Erling Rytter

Advances in Olefin Purification via Catalysis and Sorbent Materials

AUTHORS: Drs. Gabriele Centi and Wei Zhang

PEER REVIEWERS: Profs. Jim Anderson, Robert Rioux and Mr. David Artrip

Advances in Catalyst Supports

AUTHORS: Profs. Klaus Köhler, Margaret Anne Fredricks, and Simon Meyer

PEER REVIEWERS: Dr. Phillip Hughes, Daniel Duprez, and Stephen Kaskel

2013

Catalytic Conversion of Syngas to Chemical Products II

AUTHORS: Dr. Vijay Bhise, Prof. Phillipe Kalck, and Dr. Cawas Cooper

PEER REVIEWERS: Profs. James Spivey and Clark Landis

Advances in Catalysis with Precious Metals

AUTHORS: Drs. Jennifer Edwards, Jonathan Bartley and Peter Miedziak

PEER REVIEWERS: Profs. Robert Davis and Klaus Koehler

Advances in Catalysis for Oxidation Intermediates and Derivatives

AUTHORS: Drs. Rick Porcelli and Vijay Bhise

PEER REVIEWERS: Drs. Joe Porcelli and Frits Dautzenberg

2012

Advances in C₁ Chemistry

AUTHORS: Dr. Gabriele Centi

PEER REVIEWERS: Drs. Burtron Davis and Jose Fierro

Going to Zero Sulfur II

AUTHORS: Dr. Russell Chianelli and Mr. David Hirshfeld

PEER REVIEWERS: Prof. Ted Oyama and Mr. Phil Thiel

R&D Advances in Catalysis of Biochemicals

AUTHORS: Dr. Cawas Cooper and Prof. Jose L. G. Fierro

PEER REVIEWERS: Drs. Joseph Bozell and Dennis Banasiak

2011

Advances in Catalytic Reaction Engineering

AUTHORS: Drs. David Agar, Raghunath Chaudhari, Sebastian Engell, Ram Gupta and Patrick Mills

PEER REVIEWERS: Drs. James Richardson and Theodore Tsotsis

Advances in Catalytic Production of Olefins

AUTHORS: Drs. Abdullah Aitani, Burtron Davis, Gary Jacobs and Peter Pujado

PEER REVIEWERS: Drs. Kostas Triantafyllidis and Bipin Vora

Advances in Refinery Cracking Catalysts and Processes

AUTHORS: Drs. Frits Dautzenburg, Warren Letzsch, and James Speight

PEER REVIEWERS: Dr. Robert Bradway and Mr. Robert Campagna

2010

Understanding Nano-scale Catalytic Effects

AUTHORS: Drs. Harold Kung, Robert Rioux and Götz Vesper

PEER REVIEWERS: Drs. Michael Gordon and Rutger van Santen

Frontiers in Catalysis II (including: (1) Catalysis in Aqueous Media; (2) Biomimetic Catalysis; and (3) Catalysis Modeling/Simulation)

AUTHORS: Drs. Aravind Asthagiri, Shu Kobayashi and Christophe Thomas

PEER REVIEWERS: Drs. Avelino Corma and Dirk de Vos

Alternative Catalyst Manufacturing Methods

AUTHORS: Drs. Vadim Guliants, Will Medlin, Randall Meyer and Robert Rioux

PEER REVIEWERS: Mr. Billy Adkison and Dr. Alexander Katz

2009

New Methods of Catalyst Characterization

AUTHORS: Drs. Miguel Bañares, Abhaya Datye and King Yeung

PEER REVIEWERS: Drs. Armando Borgna and Bert Weckhuysen

Catalytic Process R&D Scale-Up: Challenges and Issues

AUTHORS: Drs. Muthanna Al-Dahhan, Cawas Cooper, Dmitry Murzin, Vishwas Pangarkar and Tapio Salmi and Mr. John Allen Rudesill

PEER REVIEWERS: Drs. Frits Dautzenberg and Gerhart Eigenberger

Advances in Chemical and Refining Separations Technology II

AUTHORS: Drs. Kris Anderson, Ted Funk, Kent Knaebel and Peter Goodrich

PEER REVIEWERS: Drs. William Koros and Pushpinder Puri

2008

Direct Conversion of Methane, Ethane and Carbon Dioxide to Fuels and Chemicals

AUTHORS: Drs. Gabriele Centi, Giampetro Cum, Jose L.G. Fierro and Jose M. Lopez Nieto

PEER REVIEWERS: Drs. Miguel Banares, Richard Joyner and James Lyons

Catalysis in Biofuels Applications

AUTHORS: Drs. Jon van Gerpen, S.R.A. Kersten, K. Seshan and Wim van Swaaij

PEER REVIEWERS: Drs. Anthony Bridgwater, George Huber and Martin Mittlebach

Catalytic Conversion of Syngas to Chemical Products

AUTHORS: Drs. Steven Chuang, Burtron Davis and Sunggyu Lee

PEER REVIEWERS: Drs. Arno de Klerk, Harold Kung and Yong Wang

2007

Zeolite Advances in Petroleum and Organic Chemicals III

AUTHORS: Drs. Arthur Chester, Matteo Guidotti, Michel Guisnet and Rosemarie Szostak

PEER REVIEWERS: Drs. Dirk de Vos, Eric Derouane and Wolfgang Hölderich

Advances in Catalysis by Solid Acids and Bases

AUTHORS: Drs. James Clark, Avelino Corma, Francois Figueras and Cristina Martinez

PEER REVIEWERS: Drs. David Jackson, Hideshi Hattori and Eduardo Wolf

Catalyst Deactivation, Regeneration and Disposal

AUTHORS: Drs. Calvin Bartholomew, John Birtill and Ali Hassan

PEER REVIEWERS: Mr. Chris Cutchey and Drs. Dady Dadyburjor and James Spivey

2006

Advanced Catalyst Design II

AUTHORS: Drs. David Farrusseng, Nicholas Mosey, Thomas Woo and Francisco Zaera

PEER REVIEWERS: Drs. Mark Barteau, Frits Dautzenberg and Rutger van Santen

Advances in Catalysis for Fuel Reforming and the Water Gas Shift Reaction

AUTHORS: Drs. Burtron Davis, Dennis Y.C. Leung and Sorab Vatcha

PEER REVIEWERS: Drs. Raymond Gorte, Michael Specht and David Trimm

Catalysis for the Upgrading of Heavy Oil

AUTHORS: Drs. Geoff Dolbear and James Speight

PEER REVIEWERS: Drs. Art Chester, Milind Deo and Pedro Pereira-Almao

2005

Advances in Hydrogenation in Refinery Processes and Bulk Chemicals

AUTHORS: Drs. David Jackson, Jack McWilliams and Dennis Miller

PEER REVIEWERS: Drs. Art Chester, Jack Fletcher and Jozsef Margitfalvi

Chemicals and Synthetic Fuels from Coal and Biofeedstocks

AUTHORS: Drs. Dennis Brown and Sorab Vatcha

PEER REVIEWERS: Drs. Mark Dry, Ari Geertsema and Brent Shanks

Frontiers in Catalysis (including: (1) Novel Nanomaterials in Catalysis; (2) New Reaction Media for “Green” Catalysis; and (3) Operando Spectroscopy)

AUTHORS: Drs. David Cole-Hamilton, Steven Suib and Bert Weckhuysen

PEER REVIEWERS: Drs. Miguel Banares, Frits Dautzenberg and Anne Gaffney

2004

Advances in Processes for the Selective Oxidation of Hydrocarbons

AUTHORS: Drs. Miguel Banares, James Lyons and Joseph Porcelli

PEER REVIEWERS: Drs. John Brophy, Fabrizio Cavani and Kieran Hodnett

New Technology for Olefins Production

AUTHORS: Drs. Arthur Chester, John Horsley and Sorab Vatcha

PEER REVIEWERS: Drs. Avelino Corma, Frits Dautzenberg and Geoff Dolbear

Accelerating Process and Catalyst Development with High-Throughput and Combinatorial Methods

AUTHORS: Drs. Chris Snively, Jochen Lauterbach and Eduardo Wolf and Mr. Graeme Purdy

PEER REVIEWERS: Drs. Eric Derouane, Jonathan Male and Ian Maxwell

2003

Going to Zero Sulfur: Challenges and Progress

AUTHORS: Drs. Geoffrey Dolbear, Richard Porcelli and Chunshan Song

PEER REVIEW: Drs. Arthur Chester, Russell Chianelli and Roel Prins

Process Intensification in Chemicals Production and Refinery Processes

AUTHORS: Drs. Volker Hessel, Jacob Moulijn and Sorab Vatcha

PEER REVIEW: Drs. Edward Funk, Klaus Kuehlein and Joseph Porcelli

GTL Technology: 21st Century Advances

AUTHORS: Drs. J.L.G. Fierro, Ari Geertsema and Richard Porcelli

PEER REVIEW: Drs. Dennis Brown, Rachid Oukaci and David Trimm

2002

Advances in Nanocatalysts and Products

AUTHORS: Drs. Terry Baker, John Horsley, Steven Suib and Sorab Vatcha and Mr. Clyde Payn

PEER REVIEW: Drs. Donald Freed, Markus Pridöhl and Nicola Pernicone

CombiCat Informatics Systems

AUTHORS: Drs. Laurel Harmon, Martin Holena and Uwe Rodemerck and Mr. Clyde Payn

PEER REVIEW: Drs. Jochen Lauterbach and John Newsam and Mr. James Cawse

Engineering Catalyst Pellets, Particles and Extrudates

AUTHORS: Drs. Arthur Chester, Massimo Morbidelli, Jack McWilliams, Arvind Varma and Hua Wu

PEER REVIEW: Drs. Jim Kosco, Daniel Luss and Sorab Vatcha

2001

Advances in Catalyst Support Technology

AUTHORS: Drs. Avelino Corma, John Regalbuto, James Schwartz

PEER REVIEW: Drs. Robert Davis, Steven Suib, Mr. Howard Sherry

Advances in Catalytic Reactor Technology

AUTHORS: Drs. Michael Dudukovic, Ted Funk, Jacob Moulijn

PEER REVIEW: Drs. Harold Kung, Joseph Porcelli and Sorab Vatcha

Advances in Catalytic Technology for Hydrogen and Fuel Cells

AUTHORS: Drs. Jose Luis Fierro and Levi Thompson and Mr. Clyde Payn

PEER REVIEW: Drs. Chunshan Song and Robert Farrauto

2000

C₁ Chemistry Series: Syngas and GTL Advances

AUTHORS: Drs. Burt Davis, Richard Porcelli, Kenneth Gwodz

PEER REVIEW: Drs. James Spivey, Chunshan Song, George Marcelin

Selective Oxidation of Olefins and Aromatics

AUTHORS: Drs. Fabrizio Cavani, James Lyons, Richard Porcelli

PEER REVIEW: Drs. George Marcelin, Gerard Smith

C₁ Chemistry Series: CO₂ Feedstock Utilization, Carbonylation, and Hydroformylation

AUTHORS: Drs. Sorab Vatcha, K.V. Raghavan, M. Pardhasaradhi

PEER REVIEW: Drs. James Spivey, Chunshan Song, George Marcelin

1999

Dehydrogenation and Oxidative Dehydrogenation

AUTHORS: Drs. Miguel Bañares, Richard Porcelli

PEER REVIEW: Drs. James Lyons, Israel Wachs and David Stern

Catalytic Processes Combining Reaction and Separation

AUTHORS: Drs. Edward Funk, Abraham Gelbein, and Brian Hanson

PEER REVIEW: Drs. S. Kumar Kunchal, Sorab Vatcha, and Prof. William Moser

Catalysis with Non-Zeolitic Molecular Sieves

AUTHORS: Dr. Rosemarie Szostak, Prof. Ing. Stefan Ernst, Henry Foley and Steven Suib

PEER REVIEW: Drs. Sigmund Csicsery, Edith Flanigen, and Howard Sherry

Catalysis in the 21st Century

AUTHORS: Drs. Klaus Kuehlein, Rolf Bader, Wolfgang Holderich

1998

Advances in Alkane Oxidation Processing Technology

AUTHORS: Drs. Pradip Rao, John Gleaves, and William Jones

PEER REVIEW BY: Drs. James Lyons, Umit Ozkan, and Prof. Israel Wachs

Advanced Catalyst Design

AUTHORS: Drs. Bruce Gates, Avelino Corma, Amir Hoveyda and John Newsam

PEER REVIEW BY: Dr. George Marcelin, Profs. Alexis Bell and William Goddard III

New Analytical Tools for Catalyst Characterization

AUTHORS: Drs. James Haw, William Moser, and George Metzner

PEER REVIEW BY: Dr. James Mooney and Prof. Kamil Klier

Zeolite Advances in Petroleum and Organic Chemicals II

AUTHORS: Drs. Avelino Corma, Wolfgang Holderich, John Horsley and Geoffrey Dolbear

PEER REVIEW BY: Drs. Sigmund Csicsery, Howard Sherry, and John Ward

1997

Methane Conversion

New Developments in Base Metal Catalysts

Macroporous Catalytic Materials and Ultra-Large Pore Zeolites

Advances in Chemical and Refining Separations Technology

1996

New Developments in Selective Oxidation Catalysis

Solid Acid and Superacid Catalysis

Developments in Catalyst Support Technology

Advances in Selective Hydrogenation Catalysis Volume I

1995

Zeolite Advances in Petroleum and Organic Chemicals

Advances in Catalyst Preparation

Hybrid Catalysis in Polyolefins and Copolymers

New Catalysis for Aqueous Chemical and Refining Process Waste



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