



The Energy Transition for the Chemicals and Materials Industry

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Steam cracking is Dow's largest energy-consuming chemical conversion process. Dow is working to electrify steam cracking by pursuing multiple alternative technologies. This presentation will compare various approaches for CO₂ mitigation of steam cracking process technology, including CO₂ electroreduction, process heating with renewable electricity, and burning green hydrogen. We will also review the relative thermodynamics and energy efficiencies of CO₂ capture from concentrated point sources or ambient air. We will conclude with a brief description of some steps Dow is taking to decarbonize while continuing to grow, followed by a brief look at the global commitment required to achieve substantial worldwide decarbonization by 2050.

Your Presenter, Dan Hickman

Dan Hickman is a Senior R&D Fellow in the Engineering and Process Science department of Dow's Core Research & Development. He received his B.S. in chemical engineering from Iowa State University (1988) and his Ph.D. in chemical engineering from the University of Minnesota (1992). In 31 years with Dow, Dan has served as a subject matter expert and technical leader in reaction engineering and process development for numerous reaction systems across many Dow businesses and technologies. His industrial reaction engineering experience includes working with stirred tank reactors, fixed bed reactors, trickle bed reactors, and fluidized bed reactors. His contributions at Dow include the conceptual design of new reactor systems for three commercial processes and the development of training and resources that facilitate efficient and reliable reactor scale-up from the laboratory. Dan holds 25 patents and has authored 32 journal articles and book chapters and more than 200 internal Dow reports. Dan was named the Mid-Michigan AIChE Chemical Engineer of the Year in 2014, received the CRE Practice Award from the Catalysis and Reaction Engineering Division of AIChE in 2015, was named an AIChE Fellow in 2023, and currently serves the global reaction engineering community on the board of directors for ISCRE.



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