

A Carbon Solution to the Carbon Problem: The Methanol Economy

G. K. Surya Prakash

Distinguished Professor of Chemistry, Chemical Engineering and Materials Science and George A. and Judith A. Olah Nobel Laureate Chair in Hydrocarbon Chemistry
University of Southern California
gprakash@usc.edu

Abstract: Methanol synthesized from carbon dioxide capture and conversion using water and renewable energies such as solar, wind, geothermal, atomic, etc., is a simple solution to a complex problem of climate change. Methanol is a versatile high octane, clean burning automotive fuel that is increasingly replacing gasoline, diesel and marine bunker fuel. It is also a fuel for direct oxidation methanol fuel cell, chemical feedstock to make ethylene, propylene and myriads of other chemicals and a convenient on-demand high-density hydrogen storage medium that does not require major changes to the existing infrastructure. Our recent studies on integrated carbon dioxide capture from point sources including air and its reductive conversion to methanol with hydrogen will be discussed using homogeneous as well as heterogeneous catalysts under moderate reaction conditions.

Biosketch:

Surya Prakash is a Distinguished Professor of Chemistry, Chemical Engineering and Materials Science, and Director holding the George A. and Judith A. Olah Nobel Laureate Chair in Hydrocarbon Chemistry at the Loker Hydrocarbon Research Institute at University of Southern California. His research encompasses superacid, hydrocarbon, synthetic organic, organosilicon and organofluorine chemistry, with particular emphasis in the areas of energy, greenhouse gas abatement and catalysis. He is a Co-Proponent of the Methanol Economy Concept based on carbon dioxide capture and recycling. He co-invented the direct oxidation methanol fuel cell. He is a prolific author with ~ 850 peer-reviewed publications holding > 120 patents. He has published 14 books. He has received many awards and recognitions including the American Chemical Society Awards: 2004 *Creative Work in Fluorine Chemistry*, 2006 *George A. Olah Award in Hydrocarbon or Petroleum Chemistry*, 2006 *Richard C. Tolman Award* and 2018 *Arthur C. Cope Late Career Scholars Award*. He has also received the 2007 *Distinguished Alumni Award* from IIT, Madras and the 2010 *CRSI Medal* from the Chemical Research Society of India. He has co-shared with the late Professor Olah, the inaugural \$1 Million the 2013 *Eric and Sheila Samson Prime Minister's Prize* for Innovation in Alternative Fuels for Transportation by the State of Israel. In 2015, he won the *Henri Moissan International Prize* for excellence in Fluorine Chemistry. He is a Fellow of the AAAS, a Member of the European Academy of Arts, Sciences and Humanities, a Fellow of the European Academy of Sciences, Foreign Fellow of National Academy of Sciences, India and a Fellow of the American Chemical Society. He also sits on Editorial Boards of several International Journals. Prakash's co-authored book (with G. A. Olah and A. Goepfert), "*Beyond Oil and Gas: The Methanol Economy*" (1st Edition, 2006; 2nd Edition, 2009; 3rd Expanded Edition 2018, Wiley VCH, translated into Chinese, Hungarian, Japanese, Swedish and Russian) is getting worldwide attention.