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Prof. Joseph S. Francisco
University of Pennsylvania
Talk: Chemistry in the Sky and Beyond.

Prof. Alfonso Saiz-López
CSIC (Instituto de Química Física Blas Cabrera)
Talk: Atmospheric chemistry: examples of the global impact of molecular processes.

#ICMolTalks
July, 25th - 12:00h
Assemby Hall

Prof. Joseph S. Francisco
University of Pennsylvania

Abstract

Chemistry in the Sky and Beyond

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Global climate is a top-of-mind issue for much of humanity. Will our planet become unlivable? What can we do to forestall that possibility? Can we play an active role in saving our planet without massive but inherently fragile globally coordinated action? While answering these questions is difficult, it is impossible without understanding the science. But we only have one world so how do we do that science in a meaningful and predictive way? This talk will lead us through atmospheric chemistry on Earth and beyond — where modern spectroscopy is allowing us to glimpse climate trajectories of our solar neighbors and what they might have to say about Earth's future. Expanding our knowledge from our home planet to those within the habitable zone of the universe. Francisco will talk about how the synergy between experimental and theoretical approaches provides unprecedented insights into the fundamental chemistry shared between Earth and Venus, with a specific focus on chlorine—an important element on Venus, but an ozone depleting element on Earth. The talk unearths new chemistry involving chlorine and sulfur-containing species, forming novel molecules that influence observational chemistry in Venus's atmosphere. Detailed discussions on the structure and spectroscopy of chlorine and sulfur-containing intermediates shed light on their role in connecting sulfur and chlorine chemistry on Venus, offering valuable insights and lessons from chemistry on Venus to avoid on Earth.

Biography

Joseph S. Francisco is the President's Distinguished Professor of Earth and Environmental Science and Professor of Chemistry at the University of Pennsylvania. He received his bachelor's degree from the University of Texas at Austin in 1977 and his doctorate from Massachusetts Institute of Technology in 1983. From 1983-85, Francisco trained as a Research Fellow at the University of Cambridge in England, and then returned to MIT as a Provost Postdoctoral Fellow. He was also a Visiting Associate in Planetary Science at the California Institute of Technology.

Over his career to date, Francisco has published more than 791 journal articles, written several book chapters, and is co-author of a fundamental textbook, Chemical Kinetics and Dynamics, which has been considered a "classic" in the field for about 30 years; and author of the forthcoming book, Atmospheric Chemistry by Cambridge University Press.

Francisco is a Fellow of the American Chemical Society, the American Physical Society, and the American Association for the Advancement of Science. He was elected to the American Academy of Arts and Sciences, the National Academy of Sciences, the American Philosophical Society, and the German National Academy of Sciences Leopoldina.

Francisco is currently an Executive Editor of the Journal of the American Chemical Society, and he has recently been appointed as a member of the Editorial Board for the Proceedings of the National Academy of Sciences. He was President of the American Chemical Society in 2010. He currently serves on the Board of Directors for the American Association for the Advancement of Science.

Prof. Alfonso Saiz-López
CSIC (Instituto de Química Física Blas Cabrera)

Abstract

The dominant factor in the global variation of the Earth's climate in the industrial era is the increase in the atmospheric concentration of various greenhouse gases. Some long-lived greenhouse gases, e.g. CO2, are chemically stable and persist in the atmosphere for periods of time ranging from several decades to centuries or more. However, there is a group of short-lived climate forcers such as methane and tropospheric ozone that contribute significantly to the energy balance of the atmosphere. These gases and aerosols are chemically active and their concentration is largely determined by their chemical interaction with minor, highly reactive compounds that are emitted to the atmosphere by natural and anthropogenic processes.

Biography

Prof. Alfonso Saiz-López holds a degree in Chemistry from the University of Castilla-La Mancha and a PhD in Atmospheric Chemistry from the University of East Anglia (UK). D. in Atmospheric Chemistry from the University of East Anglia (UK). After obtaining his PhD, first at NASA Jet Propulsion Laboratory and then at Harvard University (USA), he spent 5 years studying the interactions between atmospheric chemistry and climate. In 2009 he joined the CSIC (Blas Cabrera Institute of Physical Chemistry), where he has been a Research Professor since 2018, to found the first Department of Atmospheric Chemistry and Climate in Spain. Globally, his research combines: a) experimental determination of chemical species in the global atmosphere with instrumental development, b) theoretical and experimental studies of photochemistry and chemical kinetics and, c) construction of complex global chemistry-climate models. He has published 256 scientific papers, 40 of them in the highest impact journals (Nature, Science, PNAS, Nature Geoscience, Nature Communications, etc), given 100 invited and plenary lectures, and directed more than 20 national and international projects, 6 PhD theses and 21 postdoctoral researchers.

His work has been recognised with prestigious international awards (the NASA's Junior Scientist Outstanding Research Award, the European Geosciences Union's Outstanding Young Scientist Award, the American Meteorological Society's Henry Houghton Award and the American Geophysical Union's James Holton Award), and with his election as an Academician of the Royal Academy of Sciences of Spain and Fellow of the Royal Society of Chemistry of the United Kingdom.