Bringing New Substances into Existence

Christopher Cummins
Henry Dreyfus Professor of Chemistry

CURRENT RESEARCH

Uncovering the fundamental principles of chemical structure, bonding, and reactivity

Dr. Christopher Cummins, of the Massachusetts Institute of Technology, uses explanatory synthesis to bring new molecular substances into existence. His curiosity-driven research has the potential to provide astrophysicists with information needed to map the molecular composition of interstellar clouds that are the nurseries of new stars and planets. Additionally, by discovering new types of chemical bonds and transformations, Dr. Cummins and his team provide the fundamental underpinnings for making sense of what is possible on a chemical level. Their basic research allows for the development of novel ways to chemically "fix" the nitrogen molecule in order to use atmospheric nitrogen as a chemical feedstock. Therefore, through the expansion of what is known to be possible in chemistry, Dr. Cummins is able to target, synthesize, and study novel substances that are likely to have a great impact on our world.

Dr. Cummins takes an element-centric approach to uncovering these fundamental principles. His research hopes to uncover definitive examples of new chemistry involving simple molecules based upon nitrogen, phosphorous, and oxygen. He and his team use inorganic synthesis to bring into existence new molecules and substances in addition to mapping out their chemical properties. His unique approach that connects disparate themes involving molecules of the atmosphere and molecules from interstellar space to synthetic chemistry on Earth helps to address some of astronomy and chemistry's most basic questions about our universe. In addition, despite the fundamental nature of his work, through organic chemistry or transition-metal chemistry Dr. Cummins is able to make his research relevant to biological and industrial...

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AFFILIATION

Massachusetts Institute of Technology

EDUCATION

- Ph.D., in Inorganic Chemistry, 1993 , Massachusetts Institute of Technology
- A.B., in Chemistry, 1989 , Cornell University

AWARDS

- National Science Foundation Alan T. Waterman Award
- Elected to membership in the American Academy of Arts and Sciences
- American Chemical Society Award in Pure Chemistry
- American Chemical Society F. Albert Cotton Award in Inorganic Synthesis
- Raymond and Beverly Sackler Prize in the Physical Sciences

RESEARCH AREAS

Environment, Atmospheric / Space, Clean Energy, Clean Energy

FUNDING REQUEST

Your contributions will support the continued research of Dr. Christopher Cummins, of MIT, as he uncovers new chemistry involving some of the most interesting and important molecules in our universe. Your donations will support the necessary $300K required to fund personnel and equipment. In choosing to donate, you will play a part in supporting fundamental research that may shed light on some of science's oldest questions.