

Jean Dreyfus Lectureship

Chemistry Seminar

Sunlight, Water and Nanocrystals – A Promising Recipe for the Development of Sustainable Chemical Processes

Many complex molecules inspired by natural products are essential for the treatment of diseases while numerous others are desirable for use in consumer products. It is estimated that chemical manufacturing of pharmaceuticals results in the production of ca. 25-100 kg of waste per kg of product, in a manner that can be correlated with molecular complexity. When complex molecular structures are obtained using conventional chemical methods, they require multiple steps, large amounts of organic solvents, and very often, stoichiometric amounts of auxiliary reagents. Low yields and purification require even greater amounts of solvent and chemicals, and the use of large amounts of energy. Although all of these factors represent a significant problem, solutions arise from the selection and optimization of known environmentally friendly methods and from the development of new strategies. Completely unconventional solutions require the development of new paradigms in chemical synthesis, including chemical processes that require no additional reagents, catalysts, or organic solvents. We have shown that opportunities to carry out complex transformations along these lines exist by taking advantage of photochemical reactions in crystals. In this lecture, I will describe how many of the challenges incurred in the implementation of solid-state photochemical reactions can be effectively addressed by taking advantage of nanocrystals suspended in water. These include the simple implementation of analytical methods that are not readily accessible in bulk crystals, and the use of flow reactors that make it possible to carry out reactions with crystals at scales that may compete with biotechnological processes.

ACAD 1600

Sep 7th

11:00 am-noon



Prof. Miguel A. Garcia-Garibay
Department of Chemistry & Biochemistry – UCLA



Department of Chemistry
COLLEGE OF LIBERAL ARTS AND SCIENCES
UNIVERSITY OF COLORADO DENVER



Sponsored by:
The Camille & Henry Dreyfus Foundation