

第七回元素化学セミナー・講演会

◆講師◆ University of Vermont (USA)
Professor Rory Waterman

◆日時◆ 令和5年 4月17日 (月)

16:00 ~ 17:30

◆演題◆



Advances in Photocatalytic Hydrophosphination

◆場所◆ 総合研究棟 B 1 1 2 室

バーモント大学化学科のRory Waterman先生は、有機金属化学を用いて、合成化学、機能・材料化学、エネルギー資源問題に取り組んでいらっしゃる著名な研究者です。特に、リン(P)やホウ素(B)の化学的特長を活かした新反応開発に加え、化学的水素貯蔵や二酸化炭素活性化といった多彩な研究を展開され、ご活躍されています。今回、日本学術振興会の招へい外国人研究者として京都大学に来日されている機会に、筑波大学へもお越しいただき、ご講演いただけることになりました。どうぞ奮ってご参加ください。

Abstract: An important challenge for chemists is increasingly efficient routes to element-carbon bonds, as characterized by energetic costs and atom economy, among other factors. Hydrophosphination, or P-C bond formation, has challenges in substrate scope, selectivity, and catalyst activity. Starting from poor initial hydrophosphination catalysis with zirconium compounds, a family of earth abundant, highly active, and selective catalysts have been discovered and investigated. Surprisingly, photolysis is a critical factor in activity for these catalysts. The arc of catalysis moves from zirconium to iron and titanium chemistry that informs most recent discoveries in simple copper catalysts that may be the most active known. For example, bis(acetylacetonato)copper(II) is an active catalyst for the hydrophosphination of alkenes and alkynes with primary and secondary phosphines. At ambient temperature with irradiation centered at 365 nm, conversions with $\text{Cu}(\text{acac})_2$ are remarkable with some reactions complete in minutes. This simple, inexpensive catalyst is highly effective, placing hydrophosphination in the hands of many more synthetic chemists. In both cases, the photocatalysis is hypothesized to proceed by excitation to a low-lying orbital that has significant M-P antibonding character, weakening that bond to avail faster insertion.

*この講演会は、「有機化学特論I (FE14131)」(化学類)の一部になります。

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