HIGHLANDS IN CHEMISTRY SEMINAR SERIES

ROBERT FLOWERS

LEHIGH UNIVERSITY

"Proton Coupled Electron Transfer in Substrate Reduction by Sm(II)-Proton Donor Complexes"

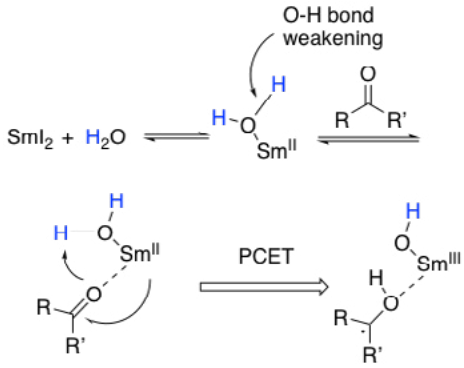
OCTOBER 11, 2019

2:30PM

HAHN HALL NORTH 140

FACULTY HOST:
JIM TANKO

The addition of water to samarium diiodide (SmI_2) has been demonstrated to enable the reduction of organic substrates traditionally thought to be outside of the reducing power of divalent samarium.We recently reported experimental evidence consistent with proton coupled electron transfer (PCET) from SmI_2-water in the reduction of arenes and carbonyls. The key feature of the system is strong coordination of water to SmI_2 that induces an O-H bond weakening in the bound proton donor enabling formal hydrogen atom transfer to substrate through PCET. In present work, we introduce studies designed to examine several questions including: 1) What is the role of halides and other ligands on substrate reduction by Sm(II)-proton donor complexes? 2) What is the relationship between the competing affinity of solvent and proton donors for Sm(II) and can this be used to design stable and selective reductants? 3) What is the limit of substrates that can be reduced by Sm(II)-proton donor complexes? Overall, this work demonstrates that the combination of the coordination of substrate and water to Sm(II) provides a configuration uniquely suited to PCET as shown in Scheme 1.



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