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Electrophilic phosphinidene complex affords novel organophosphorus compounds

Arif Ali Khan

Guru Gobind Singh Indraprastha University, India

Phosphinidenes are phosphorus analogue of carbenes. Phosphinidene tungsten pentacarbonyl complexes are extremely unstable, highly reactive and could be generated in-situ only. These intermediates could be trapped easily in presence of various reagents containing π -systems to afford a number of P-heterocycles¹. A number of compounds are known to give phosphinidene intermediates but 2H-azaphosphirene tungsten pentacarbonyl complex (1) is the most stable precursor for the in-situ generation of terminal phosphinidene complexes (2). Recently, we found that terminal phosphinidene tungsten pentacarbonyl complexes (2) reacted efficiently with the reagents containing no π -systems. For example, a reaction of terminal phosphinidene complex (2) with CCl_4 resulted in halogen atom transfer² from carbon to phosphorus. Following these results we run a few reactions of (2) with substrates containing a single carbon-halogen bond like RX ($\text{C}_6\text{H}_5\text{CH}_2$ or Me ; $\text{X} = \text{Cl}, \text{Br}$ or I) and in all cases only a single prochiral product was formed selectively as a result of the insertion-reaction of phosphinidene complexes (2) into a carbon-halogen bond³⁻⁵. This is the first example where terminal phosphinidene complexes (2) have shown insertion reactions into carbon-halogen bonds giving interesting novel route for one step selective synthesis of prochiral organophosphorus compounds.

Biography

Arif Ali Khan received his Ph.D. degree in Chemistry from A M U, Aligarh, India in 1994. He has gained experience as Research Associate and Senior Research Associate at IIT-Delhi, and as a Post Doctoral Fellow at Technical University of Braunschweig, Germany. He joined as Lecturer in Chemistry at GGSIP University, New Delhi in 2005. His research interests are in the area of Coordination Chemistry, Organophosphorus Chemistry, Organometallic Chemistry, Metal Ion Catalysed/Promoted Organic Synthesis, and Synthesis of Biofuels/ Biodiesel. He has published several research papers in reputed journals. He has successfully completed a number of national projects and international research projects.

khanaarif@hotmail.com

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