Phosphane Oxidation Catalyzed by Zerovalent Cobalt Complexes using Nitrous Oxide as Oxidant

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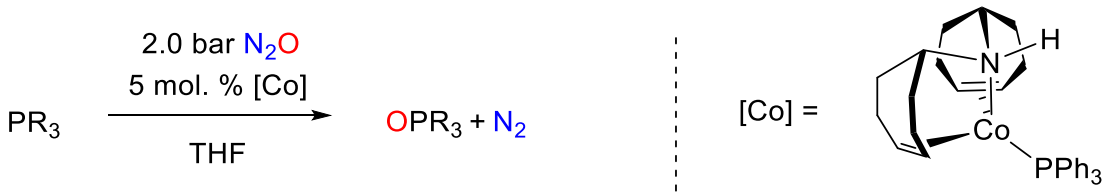
Nitrous oxide (N_2O) is industrially obtained as a by-product which has been recently identified as one of the largest global ozone depleting agents[1] and a greenhouse gas 300 times more powerful than CO_2.[2] Its transformation to less harmful chemicals is of particular interest but very challenging,[4] since even if thermodynamically unstable, nitrous oxide is kinetically inert.[3] Phosphine oxides are an important class of compounds with several applications: ligands in metal-catalyzed cross-coupling reactions (secondary phosphine oxides, $O{=}PHR_2$),[5] contact doping for silicon wafers and nanostructures, photoinitiators.[6] Traditional routes to their preparation (*e.g.* peroxides) are useful but present problems such as selectivity, functional group tolerance, complicated work-up and generation of chemical waste, and these route are not suitable for highly reactive or sensitive phosphines. The present work illustrates the use of zerovalent amino-olefin cobalt complexes in the selective oxidation of highly reactive phosphines using nitrous oxide as oxidant under mild reaction conditions.

Figure 1



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