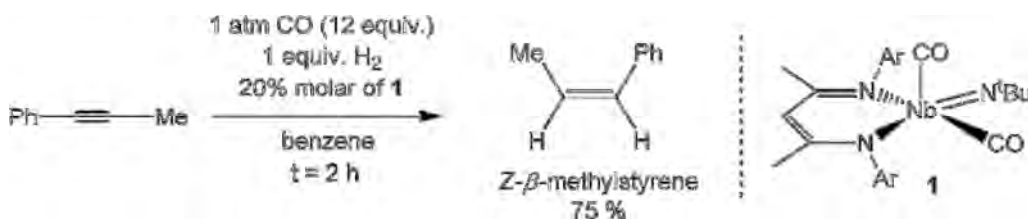


## The Arnold Group: Selective Semi-Hydrogenation of Alkynes to (Z)-Alkenes by a Niobium(III) Complex

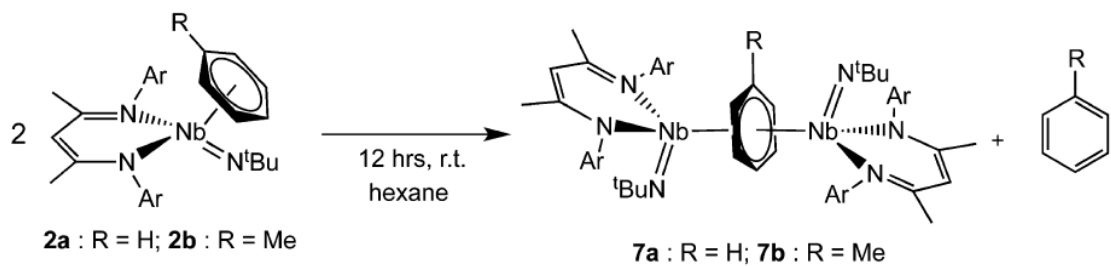
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Prof. John Arnold and his research group at UC Berkeley have consistently been publishing papers on new organometallic chemistry for well over a decade. While much of his group's work is focused on the study lanthanide and actinide complexes, development of hydrogen fuel cell electrocatalysis, and synthesis of new corrole complexes, a long-standing collaboration with the Bergman group has led to the synthesis, characterization, and utilization of new niobium complexes.

The hydrogenation of alkynes to alkenes has long been a sub-optimal process. In such reactions, using traditional heterogeneous catalysts, there are frequently issues of alkene stereoselectivity and over hydrogenation. The development of a catalyst capable of performing stereoselective semi-hydrogenations of alkynes to alkenes would be of immense practical use in industrial and research settings. Research conducted by a collaboration of the Arnold and Bergman groups have yielded a Nb(III) imido complex which is has been found capable of catalyzing such semi-hydrogenations under specific conditions (shown below)<sup>1</sup>. Mechanistic studies of this process have been conducted, yielding good preliminary results.



Continued work on similar Nb complexes has led to the synthesis and characterization of a diniohium inverted sandwich complex. This complex is notable in that it forms spontaneously in solution by a dissociative mechanism, and is abnormally unreactive for a complex of this type.<sup>2</sup>



<sup>1</sup>DOI: 10.1021/ja206016s

<sup>2</sup>DOI: 10.1021/ja311966h