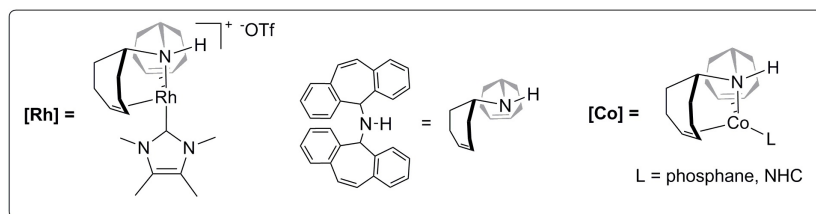
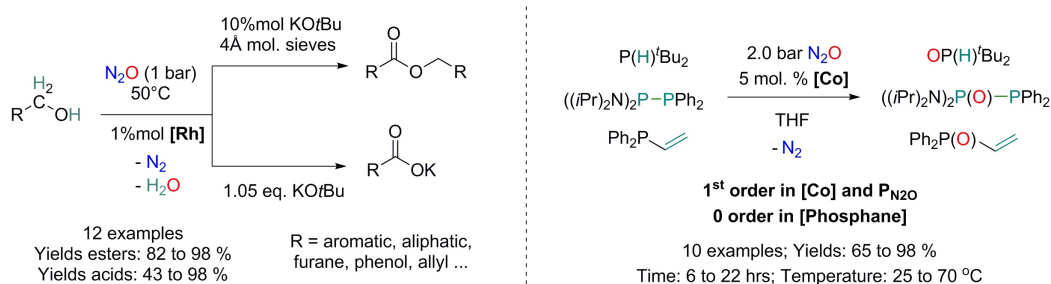


## Toward a useful catalytic transformation of N<sub>2</sub>O using group 9 organometallic complexes

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Nitrous oxide (N<sub>2</sub>O) gases have been recently identified as the largest global ozone depleting agents and as the 3<sup>rd</sup> largest emitted greenhouse gases worldwide and 300 times more powerful than CO<sub>2</sub>.<sup>[1]</sup> N<sub>2</sub>O is naturally produced via nitrification and denitrification of nitrate during nitrogen cycle, but is also an industrial waste. N<sub>2</sub>O emission has increased significantly during industrialization as a result of agricultural soil management, N-fertilizer use, livestock waste management, mobile & stationary fossil fuel, combustion and industrial processes. Its transformation to less harmful chemicals is of particular interest but very challenging, since even if thermodynamically unstable, nitrous oxide is kinetically inert.<sup>[2]</sup> We have successfully design low valent and reactive organometallic species containing group 9 metals (Rh<sup>[3]</sup> and Co<sup>[4]</sup>) that activate and catalytically transform, under mild conditions, this environmentally unfriendly molecules to valuable chemicals.



[1] a) A. R. Ravishankara, J. S. Daniel, R. W. Portmann, *Science*, **2009**, 326, 123-125. b) J. Hansen, M. Sato, *Proc. Natl. Acad. Sci. USA.*, **2004**, 101, 16109-16114.

[2] a) E. Eger, I., II. In Nitrous Oxide N<sub>2</sub>O, Elsevier: New York, **1985**. b) K. Severin *Chem. Soc. Rev.*, **2015**, 44, 6375-6386.

[3] T. L. Gianetti, S. P. Annen, G. Santiso-Quinones, M. Reiher, M. Driess, H. Grützmacher, *Angew. Chem. Int. Ed.*, **2016**, 55, 1886-1890.

[4] T. L. Gianetti, R. E. Rodriguez-Lugo, J. Harmer, M. Trincado, M. Vogt, G. Santiso-Quinones, H. Grützmacher, *Angew. Chem. Int. Ed.*, **2016**, 55, 15323-15328.