Room temperature oxidation of alcohols and alkanes to ketones with H_2O_2 an in situ prepared catalyst

Francesco Mecozzi, Jia Jia Dong,[a] Pattama Saisaha,[a] Duenpen Unjareon, Emma C. Harvey, Dirk Pijper, Paul L. Alsters,[b] Ruben P. van Summeren,[b] Johannes W. de Boer,[c] Ronald Hage,[c] Ben L. Feringa[a] and Wesley R. Browne*[a]

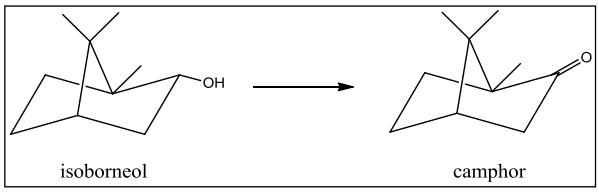
[a] Stratingh Institute for Chemistry, Faculty of Mathematics and Natural Sciences, University of Groningen, Nijenborgh 4, 9747 AG, Groningen, The Netherlands.

[b] DSM Innovative Synthesis, PO Box 18, 6160 MD Geleen, The Netherlands.

[c] Catexel BV, BioPartner Center Leiden, Galileiweg 8, 2333 BD Leiden, The Netherlands

Selective oxidation using first row transition metal based catalysts and hydrogen peroxide as terminal oxidant represents a green and economic approach to a wide range of functional group transformations .

In this contribution, the application of a recently discovered *in situ* prepared catalyst system based on manganese(II) and picolinic acid (PCA) will be described. This Mn^{II}/PCA catalyst has provev to be a highly efficient in the oxidation of electron deficient and electron rich alkenes to their *cis*-diol and epoxide products ,respectively. A key component in the system is a ketone and especially sub-stoichiometric butanedione with which the reaction proceeds at room temperature with TON of up to 300000 and TOF of 30 $s^{-1}$with near stoichiometric H_2O_2. The key role played by the ketone is the formation of hydroperoxy-hydroxy species that are the effective terminal oxidant.



Here we show that this catalytic system can engage in other oxidative transformations: secondary alcohols are readily converted to their corresponding ketones, while alkanes can be oxidized to alcohols and ketones with good selectivity. Importantly, in terms of application, the reaction is readily scalable with examples at up to 10 g scale (of substrate).

References

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