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Fast Oxidation of Styrene by Oxygen Molecule with Metal Porphyrin Mn(TPP)OAc Supported on Alumina or Silica in the Presence of Electron Transfer Agents in Various Solvents

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Abstract: The protons on a silica or alumina surface can be replaced by manganese(III) porphyrin cations, $Mn(TPP^+)$. Manganese(III) porphyrin supported on silica and alumina can activate dioxygen in the presence of additional $NaBH_4$ or $[NBu_4][BH_4]$ as an electron source and styrene, affording 1−phenyl ethanol and acetophenone in a 4:1 ratio. When oxidation was applied in a mixture of benzene/ethanol, $Mn(TPP^+)$ heterogeneous catalyst was desorpted from silica and alumina surface. The oxidation of styrene has also been studied in two phases systems H_2O/CH_2Cl_2 in the presence of $NaBH_4$ and tetra−n−butyl amonium bromide as a phase transfer catalyst. Manganese(III) porphyrin remained stable and major product was 1−phenyl ethanol, when dichloromethane used in the presence of catalyst supported on alumina, the only product was 1−phenyl ethanol.

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