PEROXIDASE-CATALYZED EPOXIDATION OF ALKENES*

Ashok Mulchandani[a**] and Brian H. Davison[b]

[a]Department of Chemical and Environmental Engineering
University of California–Riverside
Riverside, California 92521

[b]Bioprocessing Research and Development Center
Chemical Technology Division
Oak Ridge National Laboratory
Post Office Box 2008
Oak Ridge, Tennessee 37831-6226

For Presentation at

Pacifichem 2000
Honolulu, Hawaii
December 14-19, 2000

"The submitted manuscript has been authored by a contractor of the U.S. Government under contract DE-AC05-00OR22725. Accordingly, the U.S. Government retains a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or allow others to do so, for U.S. Government purposes."

* Research supported by the ED Industrial Sector - Total Program of the Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy under contract DE-AC05-00OR22725 with UT-Battelle, LLC.

** Corresponding Author.

PEROXIDASE-CATALYZED EPOXIDATION OF ALKENES*

Ashok Mulchandani[a**] and Brian H. Davison[b]

[a]Department of Chemical and Environmental Engineering
University of California–Riverside
Riverside, California 92521

[b]Bioprocessing Research and Development Center
Chemical Technology Division
Oak Ridge National Laboratory
Post Office Box 2008
Oak Ridge, Tennessee 37831-6226

ABSTRACT

Enantiopure epoxides are important building blocks in organic synthesis. The development of practical methods for enantioselective epoxidation of olefins continues to present important challenges in the field of catalysis. Peroxidases have been shown to perform assymetric epoxidation under mild conditions but their application in organic synthesis is hampered by the limited solubility of organic reactants in aqueous medium. However, due to the inactivation of the enzyme in organic medium, these applications have been limited primarily to aqueous media with low concentration (up to 25%) of organic solvent. This paper will present our results on the application of poly(ethylene glycol)-modified and sol-gel glass immobilized chloroperoxidase for epoxidation of alkenes and styrene in higher concentrations of organic solvents.

* Research supported by the ED Industrial Sector - Total Program of the Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy under contract DE-AC05-00OR22725 with UT-Battelle, LLC.

** Corresponding Author.