



Division of the History of Chemistry  
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## Citation for Chemical Breakthrough



The Development of Chirally Catalyzed Reactions

Katsuki, T.; Sharpless, K. B. *J. Am. Chem. Soc.* **1980**, *102*, 5974-5976

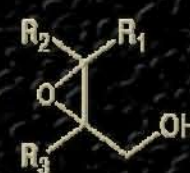
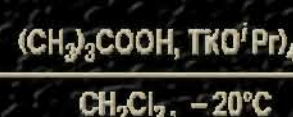
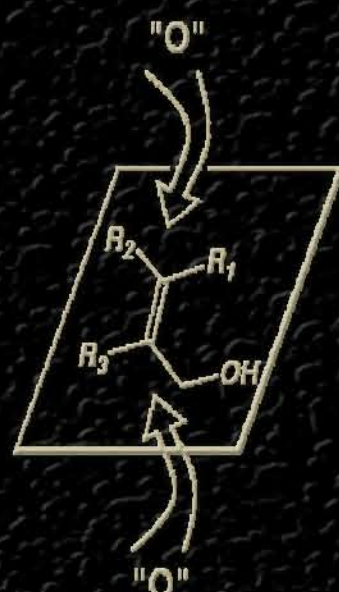
### The First Practical Method for Asymmetric Epoxidation

Sir:

As revealed in Scheme I, we have discovered a new metal-catalyzed asymmetric epoxidation process which is far more selective than any of the previously described methods<sup>1</sup> for this type of asymmetric transformation. The simplicity of this new method is one of its more attractive aspects; the necessary components [(+) or (-)-diethyl tartrate,<sup>2</sup> titanium tetrakisopropoxide, and *tert*-butyl hydroperoxide] are all<sup>3</sup> commercially available at low to moderate cost.<sup>4</sup>

#### Scheme I

*D* - (-) - diethyl tartrate (unnatural)



70 - 87 % yields,  
> 90 % e.e.

*L* - (+) - diethyl tartrate (natural)

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