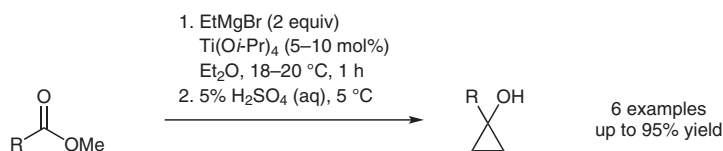


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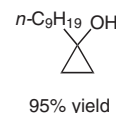
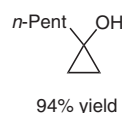
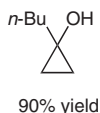
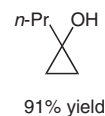
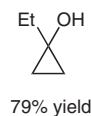
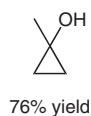
Titanium(IV) Isopropoxide-Catalyzed Formation of 1-Substituted Cyclopropanols in the Reaction of Ethylmagnesium Bromide with Methyl Alkanecarboxylates

*Synthesis* **1991**, 234.

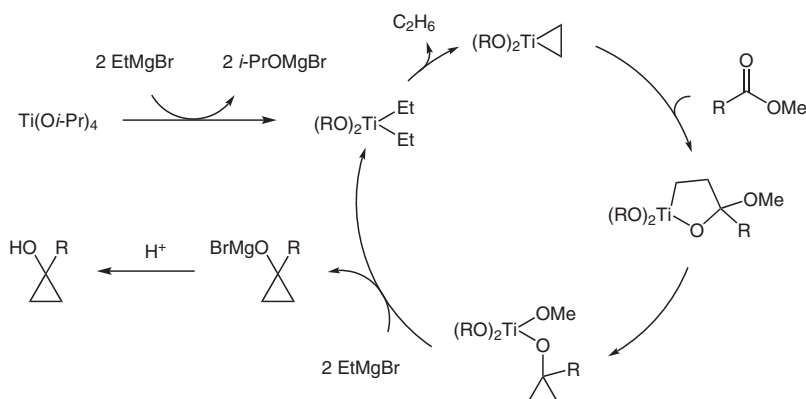
## The Catalytic Kulinkovich Reaction



### Selected examples:



### Proposed mechanism:



**Significance:** The Kulinkovich reaction generates cyclopropanols from simple Grignard reagents and esters in the presence of a titanium(IV) alkoxide catalyst. This reaction has been subsequently expanded to a wide range of substrates (see Review below) and an asymmetric version was also demonstrated by the group of Corey (*J. Am. Chem. Soc.* **1994**, 116, 9345).

**Review:** O. G. Kulinkovich, A. de Meijere *Chem. Rev.* **2000**, 100, 2789–2834.

**Comment:** Although the group of Kulinkovich previously reported the synthesis of cyclopropanols through a titanium(IV) alkoxide mediated reaction (*Zh. Org. Khim.* **1989**, 25, 2244), the current report demonstrated a method that was catalytic in titanium.