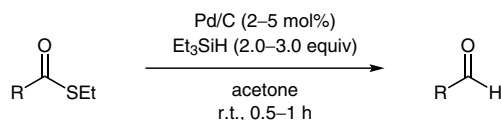


T. FUKUYAMA*, S.-C. LIN, L. LI (RICE UNIVERSITY, HOUSTON, USA)

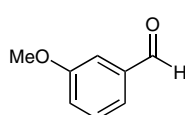
Facile Reduction of Ethyl Thio Esters to Aldehydes: Application to a Total Synthesis of (+)-Neothramycin A Methyl Ether
J. Am. Chem. Soc. **1990**, *112*, 7050–7051, DOI: 10.1021/ja00175a043.

The Fukuyama Reduction of Thio Esters to Aldehydes

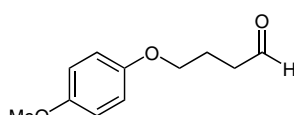


- mild reaction conditions
- broad functional group tolerance
- up to multigram scale
- up to 97% yield

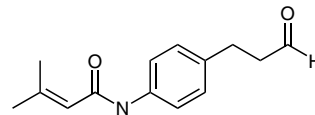
Selected examples:



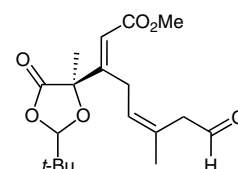
91% yield



94% yield

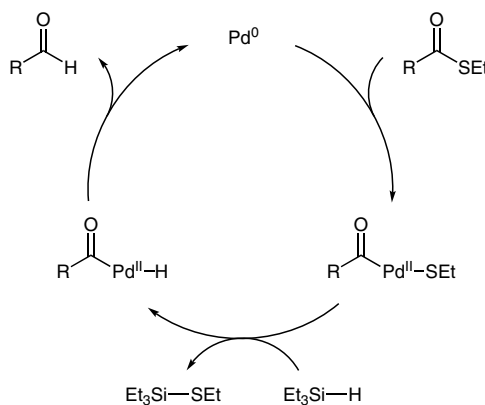


97% yield



92% yield

Proposed mechanism:



Significance: In 1990, Fukuyama and co-workers introduced a facile reduction method to transform ethyl thio esters into the corresponding aldehydes using catalytic amounts of palladium and triethylsilane as stoichiometric reducing agent. The mild reaction conditions, high chemoselectivity, and broad functional group tolerance are noteworthy features of the Fukuyama reduction.

Comment: The method also allows for converting optically active amino acids into their aldehydes without loss of stereo information. Mechanistic investigations support the shown catalytic cycle and rule out a pathway in which the hydrosilane is activated by oxidative addition to the palladium catalyst.