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Isolation of Pure Disubstituted E Olefins through Mo-Catalyzed Z-Selective Ethenolysis of Stereoisomeric Mixtures J. Am. Chem. Soc. 2011, 133, 11512-11514.

Purification of Alkene Stereoisomers through Z-Selective Ethenolysis

Mo catalyst (0.2–2 mol%) ethylene (4–20 atm)

PhH or no solvent r.t., 15 min to 18 h

$$E/Z$$
 mixture

R1

PhH or no solvent r.t., 15 min to 18 h

 E -isomer

ethenolysis products from Z -isomer

$$E = \begin{bmatrix} F/Z & F$$

Selected examples:

Mo catalyst (0.1 mol%) ethylene (20 atm)

$$n\text{-Pr}$$
 $E/Z = 4:1$
 $n\text{-Pr}$
 $n\text{-Pr}$

Two-step synthesis of pure E-olefins:

Significance: Many methods exist for preparing disubstituted E-olefins, such as the Horner-Wadsworth-Emmons reaction and olefin crossmetathesis. While these reactions have proven to be highly reliable and practical, the undesired Z-isomer is often difficult to separate by chromatography or distillation. In the present communication, the authors disclose how pure E-olefins can be obtained from an E/Z mixture through the selective ethenolysis of the Z-isomer.

Comment: The by-products of the reaction are of much lower molecular weight than the starting materials, so the pure E-isomer can often be obtained through distillation. The rate of ethenolysis is found to be up to 30 times faster for the Z-isomer, explaining why such a highly pure *E*-olefin can be obtained. The scale of the reactions was not mentioned.

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Category

Metal-Catalyzed Asymmetric Synthesis and Stereoselective Reactions

Key words

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Z-alkenes

stereoisomer purification

