Diastereoselective [4+4] Cycloadditions

Significance: Chirik and co-workers report a regio- and diastereoselective iron-catalyzed [4+4]-cycloaddition of 1,3-dienes, leading to various substituted cyclooctadienes in excellent yields.

Comment: Remarkably, with the choice of the iron catalyst, the cycloaddimerization can be controlled in a diastereoselective fashion. Extensive mechanistic studies were performed and catalytically relevant iron complexes were isolated and characterized.

Selected examples:

- **A**: n-Pent
  - 89% yield
  - **A**:B = 93:7

- **B**: n-Pent
  - 100% yield
  - **A**:B = 1:99

- **C**: n-Pent
  - 81% yield
  - **A**:B = 89:11

- **D**: n-Pent
  - 65% yield
  - **A**:B = 2:98

- **E**: (MePI)Fe(cod)
  - Selective examples:
    - 90% yield
    - **C**:D = 94:6
    - (MePI)Fe(cod) was used

- **F**: (MePI)Fe(cod)
  - 100% yield
  - **C**:D = 95:5
  - [(MePI)FeCl(μ-Cl)]2 was used

SYNFACTS Contributors: Paul Knochel, Moritz Balkenhohl

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