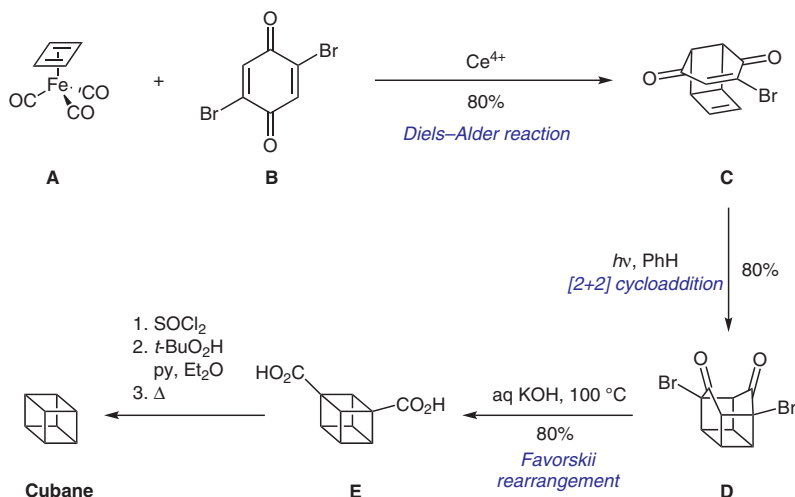


A Short Synthesis of Cubane



Significance: In 1966, Barborak, Watts, and Pettit reported the total synthesis of cubane, a highly symmetrical hydrocarbon. This synthesis appeared two years after Eaton's and Cole's seminal publication, which was also highlighted in Synfacts (*Synfacts* **2019**, *15*, 613). Pettit's insight into the chemistry of organometallic complexes and their application to the synthesis of complex targets make this work another true classic in that area.

Comment: The authors' route exploits the unique reactivity of cyclobutadiene-iron tricarbonyl **A**. Upon oxidation, this complex acts as a cyclobutadiene precursor. Indeed, exposure to Ce^{IV} ions triggers release of cyclobutadiene and reaction with quinone **B** to give rise to Diels-Alder adduct **C**. Irradiation of **C** enables a [2+2] photocycloaddition to yield polycyclic compound **D**. Two successive Favorskii rearrangements form the last two four-membered rings. Decarboxylation via the *tert*-butyl perester leads to the target compound.

Category

Synthesis of Natural Products and Potential Drugs

Key words

cubane

Diels-Alder reaction

[2+2] cycloaddition

Favorskii rearrangement

Synfact
Classic