Significance: As model compounds of fullerenes as well as possible synthetic intermediates for artificially designed fullerene derivatives, bowl-shaped \( \pi \)-conjugated compounds become important. A key partial \( C_{3y} \)-symmetric structure of fullerenes, sumanene, is synthesized in this paper. Sumanene has advantages that allow it to undergo further functionalization to create new bowl-shaped molecules. The authors report a synthetic method that enables access to sumanene under mild conditions in a short series of steps that start from commercially available norbornadiene.

Comment: In this paper, the authors present an efficient strategy to synthesize sumanene. Instead of starting from the planar compounds, the authors constructed the three-dimensional framework by using tetrahedral sp\(^3\) carbon units. Two procedures were tried to achieve the trimerization of norbornadiene, and the stepwise transmetalation via an organotin compound increased the overall yield of syn-2 from 2% to 11%. In contrast to the other well-studied bowl-shaped compound corannulene, sumanene is shown to be very rigid and the bowl-to-bowl inversion only occurs at high temperature.