Synthesis of a Tetraquinocyclobutane

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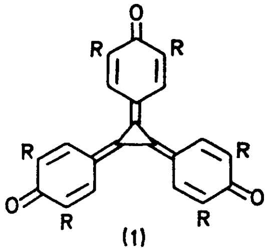
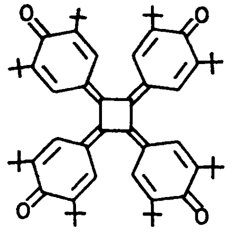
Summary Tetrakis(4-oxo-3,5-di-t-butylcyclohexa-2,5-*dienylidene*)cyclobutane (2) has been synthesized by thermal dimerization of bis-(4-oxo-3,5-di-t-butylcyclohexa-2,5-dienylidene(ethylene) (3) in refluxing toluene

THE synthesis of the triquinocyclopropane series (1) has been reported [1] We now report the synthesis of compound (2), the first in the analogous cyclobutane series, by the thermal dimerization of the diquinoethylene (3) [2]

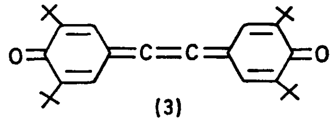


(1)

R = Me, Pr^i, or Bu^t

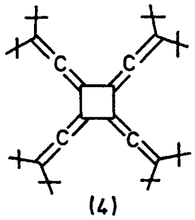


(2)

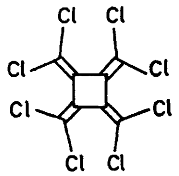


(3)

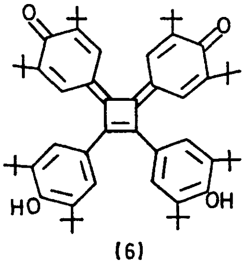
Heating compound (3) in refluxing toluene for several days leads to a low (10—12%) yield of compound (2), sparkling chestnut-brown crystals, m p 267—269° (decomp), (from hexane) At least two other products besides unchanged starting material have been detected in the reaction mixture but have not yet been identified This tetraquinocyclobutane is purple in solution unlike the relatively colourless 4-radialenes previously reported, and has complex electronic and u v spectra The u v spectrum is somewhat similar to that of the analogous triquinocyclopropane[1] but the visible absorptions occur at higher energy for compound (2) than for compound (1) As would be expected from the high degree of symmetry in the molecule, the i r spectrum is quite simple Elemental analysis and molecular weight determination by high resolution mass spectroscopy support the suggested structure The 4-radialenes (4) and (5), similarly synthesized[3,4] by thermal dimerization of cumulenes, provide some precedent for this reaction It is not known whether these dimerizations occur by [2+2]cycloaddition or by a radical mechanism.



(4)



(5)



(6)

Work is in progress to reduce compound (2) to its anion radical and further to the diaryldiquinocyclobutene (6) analogous to diarylquinocyclopropenes [1] Synthesis of other tetraquinocyclobutanes is also under investigation

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[2] D. C Zecher and R West, *J Amer Chem Soc*, 1967, **89**, 153.

[3] H O Hartzler, *J Amer Chem Soc*, 1966, **88**, 3155.

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