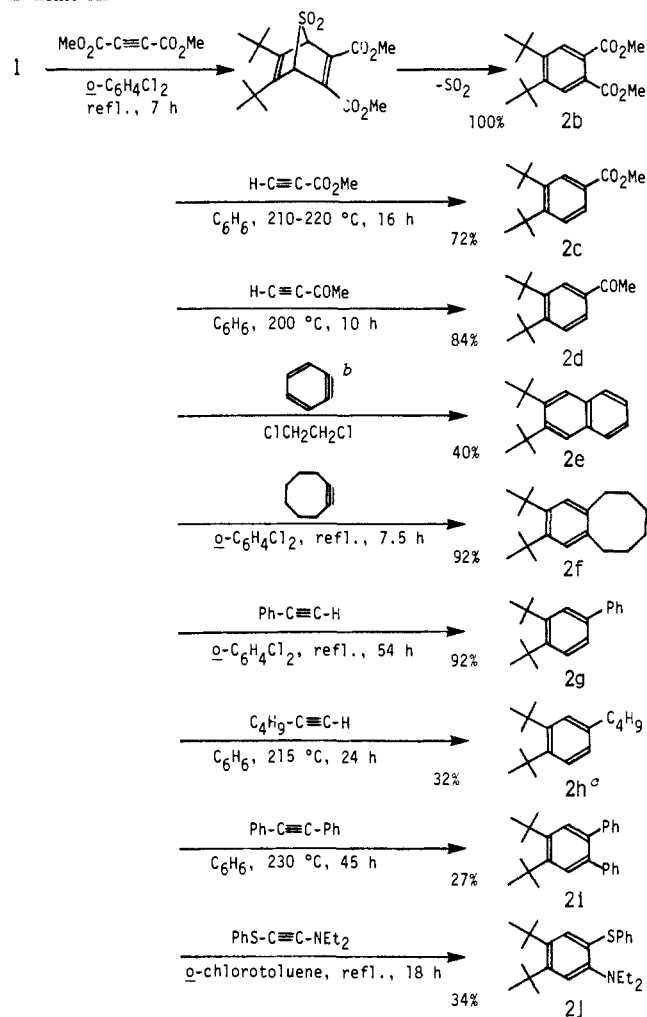


Scheme III<sup>a</sup>

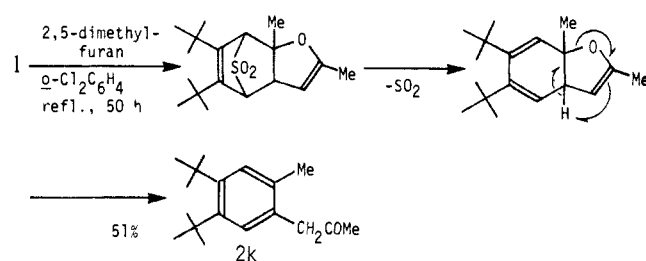
<sup>a</sup>Acetylenes except benzyne (10 equiv) and 1-hexyne (15 equiv) were used in 1.5–4.0-fold excess. <sup>b</sup>Benzyne was generated by thermolysis of 2-carboxybenzenediazonium chloride in the presence of propylene oxide in refluxing 1,2-dichloroethane. <sup>c</sup>This compound was contaminated with a small amount of unidentified impurities.

and cyclooctyne), react with **1** to give *o*-di-*tert*-butylbenzenes **2b–f** in reasonable to high yields. Even simple acetylenes, phenylacetylene, 1-hexyne, and diphenylacetylene, can react with **1** to

(1) Nakayama, J.; Yamaoka, S.; Hoshino, M. *Tetrahedron Lett.* **1988**, *29*, 1161–1164.

(2) For preparation of polysubstituted thiophenes by this procedure, see: (a) Nakayama, J.; Machida, H.; Saito, R.; Hoshino, M. *Tetrahedron Lett.* **1985**, *26*, 1983–1984. (b) Nakayama, J.; Murabayashi, S.; Hoshino, M. *Heterocycles* **1987**, *26*, 2599–2602. See, also: Nakayama, J.; Yamaoka, S.; Hoshino, M. *Tetrahedron Lett.* **1987**, *28*, 1799–1802.

Scheme IV



afford compounds **2g–i**. Relatively low yield of **2j** observed by reaction with a ynamine may come from the steric repulsion between substrates.

Finally reaction of **1** with excess 2,5-dimethylfuran afforded **2k** in 51% yield (Scheme IV). In this case 2,5-dimethylfuran acts as an equivalent of 4-hexyn-2-one. This type of reaction is precedented.<sup>15</sup>

In conclusion the reaction of **1** with acetylenes and their synthetic equivalents provides a very facile synthesis of *o*-di-*tert*-butylbenzene and its many derivatives.

**Supplementary Material Available:** Experimental procedures for the preparation of compounds **1** and **2a–k** and characterization data for these compounds (<sup>1</sup>H NMR, <sup>13</sup>C NMR, and high resolution MS) (8 pages). Ordering information is given on any current masthead page.

(3) Sterically overcrowded 3,4-di-*tert*-butylthiophene was first synthesized in 1980 after numerous unsuccessful attempts: Brandsma, L.; Meijer, J.; Verkruisje, H. D.; Bokkers, G.; Duisenberg, A. J. M.; Kroon, J. J. *Chem. Soc., Chem. Commun.* **1980**, 922–923.

(4) For Diels–Alder reaction of thiophene 1,1-dioxides, see: Rajappa, S. In *Comprehensive Heterocyclic Chemistry*; Bird, C. W., Cheeseman, G. W. H., Eds.; Pergamon: New York, 1984; Vol. 4, Chapter 3.14.

(5) (a) Greenberg, A.; Liebman, J. F. *Strained Organic Molecules*; Academic: New York, 1978; Chapter 3. (b) Okazaki, R. *Yuki Gosei Kagaku Kyokai-shi* **1974**, *32*, 704–717.

(6) Krücker, U.; Hoogzand, C.; Hübel, W. *Chem. Ber.* **1961**, *94*, 2817–2820.

(7) Hoogzand, C.; Hübel, W. *Angew. Chem.* **1961**, *73*, 680.

(8) Arnett, E. M.; Strem, M. *Chem. Ind. (London)* **1961**, 2008–2009.

(9) Barclay, L. R. C.; Milligan, C. E.; Hall, N. D. *Can. J. Chem.* **1962**, *40*, 1664–1671.

(10) Burgstahler, A. W.; Abdel-Rahman, M. O. *J. Am. Chem. Soc.* **1963**, *85*, 173–180.

(11) Burgstahler, A. W.; Chien, P.-L.; Abdel-Rahman, M. O. *J. Am. Chem. Soc.* **1964**, *86*, 5281–5290.

(12) For preparation of 1,2,3-tri-*tert*-butylbenzenes, see: (a) Viehe, H. G.; Merenyi, R.; Oth, J. F. M.; Valange, P. *Angew. Chem.* **1964**, *76*, 885. (b) Viehe, H. G. *Angew. Chem.* **1965**, *77*, 768–773. For 1,2,4,5-tetra-*tert*-butylbenzene, see: (a) Hoogzand, C.; Hübel, W. *Tetrahedron Lett.* **1961**, 637–643. (b) Arnett, E. M.; Strem, M. E.; Friedel, R. A. *Tetrahedron Lett.* **1961**, 658–662.

(13) Haefelinger, G.; Marb, M. *New J. Chem.* **1987**, *11*, 401–402.

(14) Paquette, L. A.; Moerck, R. E.; Harirchian, B.; Magnus, P. D. *J. Am. Chem. Soc.* **1978**, *100*, 1597–1599.

(15) Raasch, M. S. *J. Org. Chem.* **1980**, *45*, 867–870.

(16) Clandernan, B. H.; Criswell, T. R. *J. Org. Chem.* **1969**, *34*, 3426–3430.

## Additions and Corrections

**1-Methyl-4,5-cyclopentenoborepin: A Neutral Boron Analogue of Tropylium** [*J. Am. Chem. Soc.* **1987**, *109*, 1879]. ARTHUR J. ASHE III\* and FREDERICK T. DRONE

Pages 1879 and 1880: The <sup>11</sup>B NMR chemical shift value reported for compound **10** is wrong. The correct chemical shift value is  $\delta$  32.1 referenced to external BF<sub>3</sub>·OEt<sub>2</sub> at  $\delta$  0. Thus the NMR data suggest that borepin serves as a  $\eta^7$  ligand toward Cr(CO)<sub>3</sub>. We regret any confusion this mistake may have caused.

**Investigations of a Siloxane-Based Polymer Electrolyte Employing <sup>13</sup>C, <sup>29</sup>Si, <sup>7</sup>Li, and <sup>23</sup>Na Solid-State NMR Spectroscopy** [*J. Am. Chem. Soc.* **1988**, *110*, 3036–3043]. R. SPINDLER and D. F. SHRIVER\*

Page 3037, the caption for Figure 2 should read as follows: Figure 2. Solid-state <sup>13</sup>C NMR spectra of siloxane(30) employing (A) MAS and DD (spinning rate = 1400 Hz), (B) MAS, (C) static and DD, and (D) static.