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## Phosphorus, Sulfur, and Silicon and the Related Elements

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## Synthesis and Structure of Thiophene, Selenophene, and Related Compounds Carrying Four Phosphoryl Groups

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## Synthesis and Structure of Thiophene, Selenophene, and Related Compounds Carrying Four Phosphoryl Groups

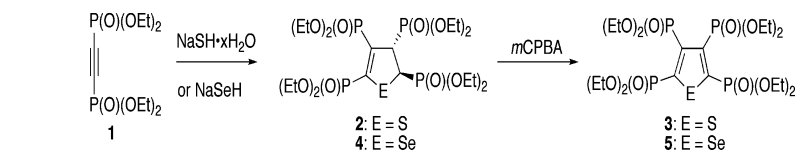
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*Dihydrotetraphosphorylthiophene 2 was synthesized by the addition of sodium hydrosulfide to 2 equivalents of diphosphorylacetylene 1 followed by cyclization. Oxidation of 2 with mCPBA afforded tetraphosphorylthiophene 3. The corresponding selenium compounds 4 and 5 were analogously synthesized.*

**Keywords** Dihydrothiophene; phosphoryl group; thiophene

Reaction of less than a half equivalent of sodium hydrosulfide with diphosphorylacetylene **1** in ether gave dihydrothiophene **2** (Scheme 1). Although attempted aromatization of **2** with *o*- or *p*-chloranil, or DDQ resulted in recovery of **2**, oxidation of **2** with *m*CPBA afforded the corresponding sulfoxide, and dehydration of the sulfoxide gave thiophene **3**. Employment of sodium hydroselenide in place of sodium hydrosulfide gave **4**, and oxidation of **4** with *m*CPBA afforded **5**.



**SCHEME 1**

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