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

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713618290>

### Reactions of 2,4-Bis-(3,5-Di-Tert-Butyl-4-Hydroxy-Phenyl)-1,3-Dithioxhosphetane with Certain Nucleo-Philic Reagents

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**To cite this Article** Cherkasova, O. A. , Cherezova, E. N. , Mukmeneva, N. A. and Kirov, S. M.(1990) 'Reactions of 2,4-Bis-(3,5-Di-Tert-Butyl-4-Hydroxy-Phenyl)-1,3-Dithioxhosphetane with Certain Nucleo-Philic Reagents', *Phosphorus, Sulfur, and Silicon and the Related Elements*, 51: 1, 202

**To link to this Article:** DOI: 10.1080/10426509008040736

**URL:** <http://dx.doi.org/10.1080/10426509008040736>

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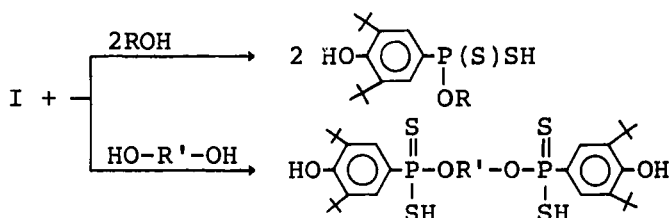
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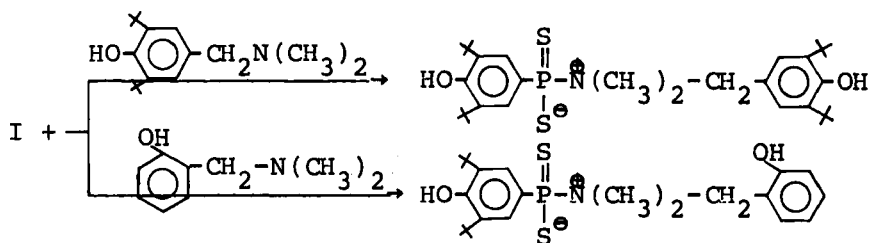
# REACTIONS OF 2,4-BIS-(3,5-DI-TERT-BUTYL-4-HYDROXY-PHENYL)-1,3-DITHIOXAPHOSPHETANE WITH CERTAIN NUCLEOPHILIC REAGENTS

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2,4-bis-(3,5-di-tert-butyl-4-hydroxyphenyl)-1,3-di-thioxaphosphetane (I) has been prepared by interaction of 2,4-di-tert-butyl phenol with phosphorus pentasulfide in cumene as solvent. Reactions of I with alcohols and diols are shown to proceed readily with formation of the appropriate dithiophosphonic acids:



In reaction with the phenolic Mannich bases I affords the corresponding betaines:



Structures of the synthesized compounds have been confirmed by NMR ( $^1\text{H}$ ,  $^{13}\text{C}$ ,  $^{31}\text{P}$ ) and IR spectra.

The observed high antioxidative activity of the above derivatives of I in polymers has been found to coincide with their high effectiveness both in inhibiting free radical oxidation and in decomposing hydroperoxides.