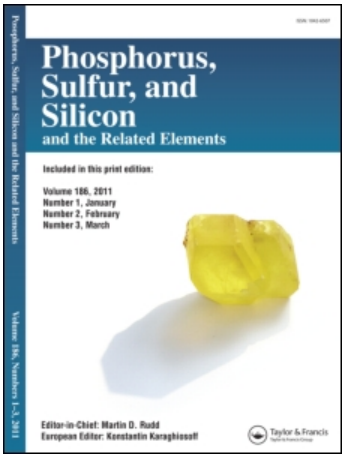


Phosphorus, Sulfur, and Silicon and the Related Elements

Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713618290

The Synthesis of Phosphorus Analogues of Hydantoic Acid

Li Zai-guo[a]; Huang Run-qiu[a]; Li Hui-ying[a]
[a] Institute and State Key Laboratory of Elemento-Organic Chemistry Nankai University, Tianjin, P.R.C.

To cite this Article Zai-guo, Li , Run-qiu, Huang and Hui-ying, Li(1999) 'The Synthesis of Phosphorus Analogues of Hydantoic Acid', Phosphorus, Sulfur, and Silicon and the Related Elements, 147: 1, 453
To link to this Article: DOI: 10.1080/10426509908053706
URL: http://dx.doi.org/10.1080/10426509908053706

Phosphorus, Sulfur and Silicon, 1999, Vol. 147, pp. 453-453
Reprints available directly from the publisher
Photocopying permitted by license only

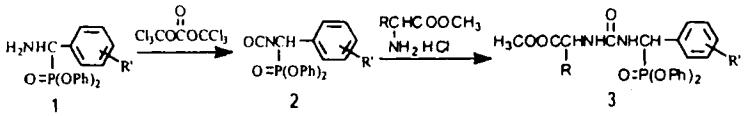
The Synthesis of Phosphorus Analogues of Hydantoic Acid

LI ZAI-GUO, HUANG RUN-QIU and LI HUI-YING

Institute and State Key Laboratory of Elemento-Organic Chemistry, Nankai University, Tianjin, 300071, P.R.C.

Hydantoic acids have attracted much attention due to their good fungicidal, herbicidal activities and low toxicity for fish and warm-blooded animals.[1] In this paper, some substituted ureidoalkyl-phosphonates **3**, the phosphorus analogues of hydantoic acids, are synthesized.

The reported method for synthesis of ureidoalkylphosphonates is limited to the P-Mannich type reaction of substituted ureas, aldehyde and phosphite[2]. In this paper, a novel method for synthesis of ureidoalkyl-phosphonates is reported (Scheme I). The easily accessible α-aminoalkyl-phosphonic acid diphenyl esters **1** were converted to **3** with high yields (86-96%) by treated with triphosgene and amino acid methyl ester hydrochlorides consequently in one pot.



R=H,CH(CH$_3$)$_2$, CH$_2$CH(CH$_3$)$_2$, CH$_2$Ph; R'=H, 2-Cl, 4-Cl, 2,4-Cl$_2$, 4-CH$_3$, 3-NO$_2$

Scheme I

In the synthetic procedure, the intermediates α-isocyanato-alkylphosphonic acid diphenyl esters **2** are observed (IR.: ν_{NCO} ~2240cm^{-1}) after the treatment of **1** with triphosgene. Using this method, a large variety of substituted ureidoalkylphosphonic acid diphenyl esters are prepared in good yields.

References

[1] A. Cegan, M. Vecera, Coll. Czech. Chem. Commun.,1984, 49, 1521.

[2] G.H. Birum, J. Org. Chem., 1974, 39(2), 209.