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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>

Chiral Symmetric Alkylamides of Phosphoric and Phosphonic Acids

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Online publication date: 27 October 2010

To cite this Article Kolodiaznyi, Oleg I. and Andruschko, Natalia(2002) 'Chiral Symmetric Alkylamides of Phosphoric and Phosphonic Acids', *Phosphorus, Sulfur, and Silicon and the Related Elements*, 177: 8, 2109 – 2110

To link to this Article: DOI: 10.1080/10426500213447

URL: <http://dx.doi.org/10.1080/10426500213447>

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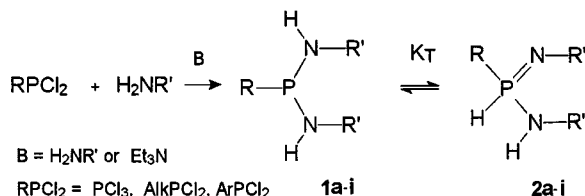
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CHIRAL SYMMETRIC ALKYLAMIDES OF PHOSPHORIC AND PHOSPHONIC ACIDS

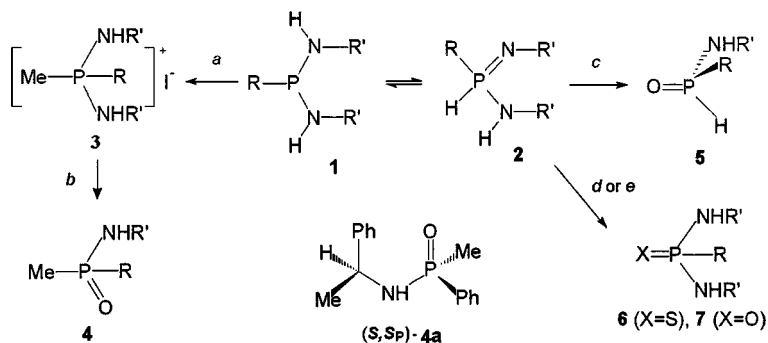
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(Received July 29, 2001; accepted December 25, 2001)

Chiral symmetric alkylamides of trivalent phosphorus acids **1** exist in prototropic equilibrium with PH-iminophosphoranes **2**. Phosphorus–nitrogen diad tautomeric equilibrium $1 \rightleftharpoons 2$ depends on the nature of solvents and the substituents at the phosphorus and nitrogen atoms shifting toward the tautomeric form possessing the least mobile proton.



SCHEME 1



SCHEME 2

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The chemical properties of compounds **1** are similar to those of other trivalent phosphorus compounds, confirming their structure. Compounds **1** are alkylated by methyl iodide to furnish phosphonium salts, the alkaline hydrolysis of which results in the formation of chiral amidophosphinates **3** (de $\sim 100\%$). The reaction of aminophosphines **1** with formic acid resulted in amides of phosphinic acid **4**. The compounds **1** are also easily oxidized and add sulfur with the formation of P=S or P=O derivatives.