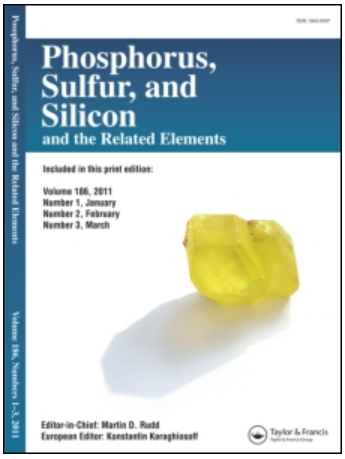


Phosphorus, Sulfur, and Silicon and the Related Elements
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713618290

The Phosphoryl and the Carbonyl Group as Hydrogen Bond Acceptors

Agnes M. Modro[a]; Tom A. Modro[a]
[a] University of Pretoria, South Africa

Online publication date: 27 October 2010

To cite this Article Modro, Agnes M. and Modro, Tom A.(2002) 'The Phosphoryl and the Carbonyl Group as Hydrogen Bond Acceptors', Phosphorus, Sulfur, and Silicon and the Related Elements, 177: 8, 2067
To link to this Article: DOI: 10.1080/10426500213336
URL: http://dx.doi.org/10.1080/10426500213336

Phosphorus, Sulfur and Silicon, 2002, Vol. 177:2067

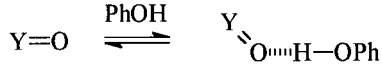
1042-6507/02 $12.00 + .00
DOI: 10.1080/10426500290094594

THE PHOSPHORYL AND THE CARBONYL GROUP AS HYDROGEN BOND ACCEPTORS

Agnes M. Modro and Tom A. Modro
University of Pretoria, South Africa

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

The hydrogen bonding acceptor abilities of the phosphoryl and the carbonyl groups were compared by determining the formation constants for the complexes between a selected donor (phenol) and selected phosphoryl or carbonyl compounds from the IR $\Delta\nu$ shifts.[1]



(Y = C, P)

For simple carbonyl compounds the K_{assoc} values were determined from the $\Delta\nu_{OH}$ for the donor. The obtained values are in the range 7–12, and agree well with the literature data. For selected phosphoryl compounds two sets of K_{assoc} values were determined—from the $\Delta\nu_{OH}$, and the $\Delta\nu_{P=O}$ shift. The former were in the range 300–600 and agree well with the literature data, indicating that the P=O group is about two orders of magnitude stronger acceptor than the C=O group. The values of K_{assoc} determined from the $\Delta\nu_{P=O}$ shifts were much lower and scattered, indicating that the IR absorption band of the P=O group shows weak response to the involvement in the hydrogen bonding.

For the β-diphosphoryl, or for the 1,3-ketophosphoryl systems, no evidence for the enolization involving the P=O function was found.

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Address correspondence to Tom A. Modro, Centre for Heteroatom Chemistry, Department of Chemistry, University of Pretoria, Pretoria 0002, South Africa.
E-mail: tamodro@scientia.up.ac.za