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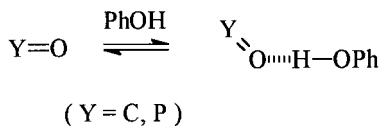


THE PHOSPHORYL AND THE CARBONYL GROUP AS HYDROGEN BOND ACCEPTORS

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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



For simple carbonyl compounds the K_{assoc} values were determined from the $\Delta\nu_{\text{OH}}$ 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 $\Delta\nu_{\text{OH}}$, and the $\Delta\nu_{\text{P}=\text{O}}$ 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 $\Delta\nu_{\text{P}=\text{O}}$ 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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