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535.33-1:547.555

Note

Investigation of IR-Spectra of *N*-Benzoyl--*N*-phenylhydroxylamine in Carbon Tetrachloride

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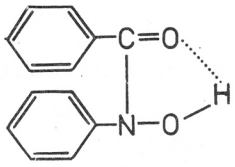
Spectra of carbon tetrachloride solutions of *N*-benzoyl-*N*-phenylhydroxylamine in concentrations between 1×10^{-4} and 25×10^{-4} *M*, in the spectral range from 2800 cm^{-1} to 4000 cm^{-1} were measured. Appearance of the absorption band at 3070 cm^{-1} is ascribed to C—H stretching, and the band at 3250 cm^{-1} to H...O—H bond. The validity of Beer's law for the band at 3250 cm^{-1} and the fact that no bands between 3400 and 4000 cm^{-1} were detected indicate the presence of an intramolecular H bond.

Recently *N*-benzoyl-*N*-phenylhydroxylamine (BPH) has been applied for the solvent extraction of some elements[1,2].

In our determination[3] of equilibrium constants for complexes of vanadium with BPH, we used nonpolar organic solvents. In this respect it was important to know the behaviour of BPH in such solvents.



BPH is a polar molecule capable of forming hydrogen bonds. This may lead to strong selfassociation in non-polar organic solvents. IR spectroscopy was used to show the type of hydrogen bonding.

Spectra of solutions of BPH in CCl_4 at concentrations from 1×10^{-4} to 25×10^{-4} *M* were measured. A 102.6 mm cell with glass windows about 0.8 mm thick was used. The spectra were obtained with a VEB Carl Zeiss, Jena, double beam IR spectrophotometer Model UR-10. The spectral slit width ranged form 2 to 4 cm^{-1}.

In the spectral range from 2800 cm^{-1} to 4000 cm^{-1} two absorption bands were detected, at 3070 cm^{-1} and 3250 cm^{-1} (Fig. 1). From the analogy of these bands and literature data[4-7], we ascribed the band at 3070 cm^{-1} to C—H stretching and the band at 3250 cm^{-1} to the intramolecularly bonded OH group. The fact that no bands between 3400 and 4000 cm^{-1} were detected indicates the absence of free OH groups and hence intramolecular bonding.

This is further substantiated by the fact that the plot of the absorption intensity at 3250 cm^{-1} *vs.* BPH concentration in CCl_4 gives a straight line (Fig. 2).

Hence, it is concluded that at these concentrations of BPH no association takes place.

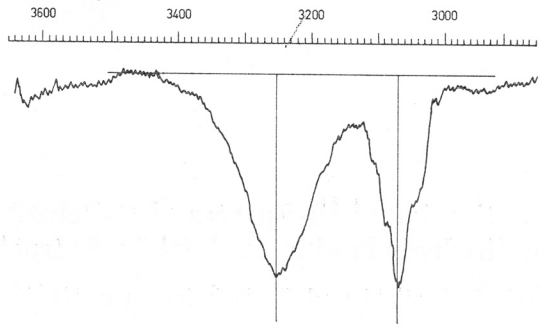


Fig. 1. IR absorption spectrum of 8×10^{-4} *M* BPH solution in CCl_4.

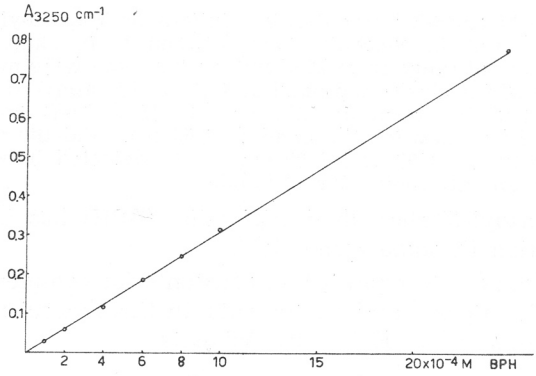


Fig. 2. Calibration curve for the BPH solutions in CCl_4 at 3250 cm^{-1}.

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REFERENCES

1. K. F. Fouché, *Talanta* **15** (1968) 1295.
2. J. Hala, *J. Inorg. Nucl. Chem.* **29** (1967) 187.
3. V. Dražić-Antonijević, V. Vajgand, and I. J. Gal, *Croat. Chem. Acta* **41** (1969) 97.
4. R. L. Dutta and S. Lahiry, *J. Indian Chem. Soc.* **39** (1962) 860.
5. M. Davies and N. A. Spiers, *J. Chem. Soc.* **1959**, 3971.
6. R. E. Nightigale and E. L. Wagnes, *J. Chem. Phys.* **22** (1959) 204.
7. G. C. Pimentel and A. L. McClellan, *The Hydrogen Bond*, W. H. Freeman & Co., San Francisco, 1960, p. 167.

IZVOD

Ispitivanje IR spektra *N*-benzoil-*N*-fenilhidroksilamina

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Snimljeni su IR spektri *N*-benzoil-*N*-fenilhidroksilamina u ugljen tetrahloridu za koncentracije od 1×10^{-4} do 25×10^{-4} *M*, i u spektralnoj oblasti od 2800 do 4000 cm^{-1}. Pojava trake na 3070 cm^{-1} pripisuje se C—H istežućoj vibraciji, a trake na 3250 cm^{-1} O..H...O vezi. Utvrđeno je da za traku na 3250 cm^{-1} važi Beer-ov zakon što, pored odsustva traka u oblasti od 3400 do 3700 cm^{-1}, ukazuje na postojanje intramolekulske vodonične veze.

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