Physical Sciences Section


SPECTROSCOPIC STUDIES OF ORGANOPHOSPHORUS COMPOUNDS

Part IX. IR Spectra of Tri-\(\alpha\)-tolylphosphine and Alkyltri-\(\alpha\)-tolylphosphonium Iodides*  

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Abstract. The IR spectra of tri-\(\alpha\)-tolylphosphine and alkyl-tri-\(\alpha\)-tolylphosphonium iodides where the alkyl group is methyl, ethyl, n-propyl or n-butyl group have been reported and assignments in the 1600–250 cm\(^{-1}\) region made on the basis of band position and integrated intensity measurements. The intensity of the spectral bands of these compounds is comparable with \(m\)-tolyl and lower than the phenyl and \(p\)-tolyl compounds. This is suggested to be a result of steric overcrowding. This phenomenon is found to decrease as the chain length is ascended as shown by the intensity of various modes in general and mode \(n\) in particular. The bands at 745, 540 and 504 cm\(^{-1}\) are split into doublets or triplets with a separation of 10–40 cm\(^{-1}\). The splitting is discussed in terms of quaternization. The \(v_{as}\) P–C\(_{aliphatic}\) absorbs weakly and occurs at 780 ± 10 cm\(^{-1}\).
THE REVERSIBLE AND IRREVERSIBLE SEPARATION OF GASES BY PARTITION CHROMATOGRAPHY

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Abstract. A conceptual, but concise, account of the nature of the partition gas chromatographic separation process, from the view point of thermodynamics and with special reference to entropy changes, is presented. Based on a philosophical and qualitative approach, illustrated through simple physical principles, the treatment embodies the quantitative aspects of the problem as well. This has been taken up with regard to the free energy of dilution, or for that matter, the entropy of mixing and unmixing. Furthermore, the quantitative contributions of the carrier gas and the liquid stationary phases to the overall entropy changes have been derived for a binary system, whereby the analysis reveals the isentropic nature of the chromatographic separation process.
THE STRUCTURE OF DENDROPANOXIDE

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Abstract. The structure of dendropanoxide, otherwise known as campanulin, has been shown to be 3:10-epoxy-D-β-friedo-oleanane. The NMR and mass spectra show conclusively that it contains a 5-membered oxide ring.
ISOLATION AND STRUCTURE OF CROTALARINE, A NEW ALKALOID FROM CROTALARIA BURHIA BUCH.-HAM.

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Abstract. Crotalarine, \( C_{18}H_{27}NO_6 \), m.p. 167-68°, \([\alpha]_D^{26} = -79.8° \) (ethanol), a new alkaloid isolated from the aerial parts of the plant Crotalaria burhia was hydrogenated in the presence of platinum oxide catalyst to tetrahydrocrotalarine, the properties of which indicated it to be a salt. Crotalaric acid was obtained from the salt. By alkaline degradation crotalarine gave s-butyl methyl ketone, DL-lactic acid and retronecine. Crotalarine absorbed one mole equivalent of periodic acid in 25-30 min and formed a cyclic sulphite ester with thionyl chloride. The properties and IR spectra of crotalarine, tetrahydrocrotalarine and crotalaric acid resembled closely those of trichodesmine, tetrahydrotrichodesmine and trichodesmic acid. A structure formula is proposed which satisfies all the properties of this alkaloid.
EFFECT OF SOLVENT-SOLUTE INTERACTIONS ON C—H AND C≡C STRETCHING VIBRATIONS OF ACETYLENE

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Abstract. The antisymmetric C—H and symmetric C≡C stretching vibrations (ν3 and ν2) of acetylene have been studied in solution. Accurate measurements of the frequency of the C≡C stretching vibration which appeared in a range of solvents have shown the involvement of C≡C group into specific interactions similar to the C—H group.
Short Communications


HUCKEL MOLECULAR ORBITAL CALCULATION AND SPIN POLARIZATION PARAMETER IN A TRIVALENT NITROGEN: TRIS-\(p\)-NITROPHENYLAMINE CATION

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**CYCLIC VOLTAMETRIC STUDIES**

**Part I. 1-Ethyl-4-Carbomethoxypyridinium Iodide in Acetonitrile**

**Mahboob Mohammad, M. Saleem, Saleem Qureshi and Imtiaz Hanif**
Biological Sciences Section


THE PECTIC SUBSTANCES OF PIGMENTED ONION SKINS: FORMATION OF GALACTURONE IN HEATED PECTIN AND PECTIC ACID SOLUTIONS

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(Received May 28, 1973; revised September 29, 1973)

Abstract. A galacturone was formed on thermal treatment of aqueous solutions of pectin or pectic acid suspensions. Isolation of the galacturone was performed by chromatography on a cellulose column and its characterization was achieved.
STATISTICAL STUDIES OF LIGHT TRAP CATCHES OF ZYGINIDIA QUYUMI (AHMED) (CICADELLIDAE: HOMOPTERA) ON WHEAT IN PUNJAB

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(Received May 18, 1973; revised September 14, 1973)

Abstract. Light trap studies were made on the leafhopper species Zyginidia quyumi (Ahmed on wheat, at Tandlianwala (Distt. Lyallpur, Punjab). The species is quite abundant on the crop and was particularly prevalent between March 28, 1972-April 6, 1972, when the studies were made. Five coloured lights (60W each) red, green, yellow, blue and ordinary lights were used to attract leafhoppers for a period of about 30 min from sunset. The arrangement of lights was rotated daily, and the catches continued for 10 days. The daily catches have been analysed statistically for the relative preference of light colours by the leafhoppers, the involvement of sex in light attraction, and the interaction of sexes and lights. It has been concluded that there is no significant sex effect on the attraction of Z. quyumi to various light colours, the overall effect of colours on Z. quyumi is highly significant and the interaction of sex and light is not significant.
A CONTRIBUTION TO THE KNOWLEDGE OF COREID FAUNA IN NATIONAL INSECT MUSEUM OF PAKISTAN (HEMIPTERA, COREIDAE)*

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(Received April 27, 1973; revised October 3, 1973)

Abstract. The 34 identified species of the coreid fauna in the National Insect Museum of Pakistan, belonging to the former British India, are listed below. This list is being published in order to provide information to all the workers about the existence of these rare specimens in Pakistan.
THE PHYSIOLOGICAL ASPECTS OF ABSCISSION WITH A REFERENCE TO COTTON PLANT

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Short Communications


CONSTITUENTS OF DELPHINIUM ORIENTALE

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(Received July, 6, 1973; revised September 28, 1973)
STUDIES ON NEEM PLANT AS REPELLENT AGAINST STORED GRAIN INSECTS

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(Received June 11, 1973; revised October 6, 1973)

Abstract. The extracts of various plants were tested against stored grain insects; the ‘neem’ plant possessed maximum repellent property. The maximum repellency was exhibited by seeds compared with leaves, flowers and fruits of ‘neem’ plant. It was further observed that the adults of Rhyzopertha dominica F. were less affected. The flour beetles fed on neem-extract-impregnated flour failed to reproduce and their feeding activity, determined by using $^{32}$P labelled-flour, was greatly reduced.
ANODIC OXIDATION OF HYDRAZINE ON SILVER

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(Received June 7, 1973)

Abstract. The oxidation of hydrazine in alkaline solutions was investigated on silver electrode. Coulometry, potentiostatic pulse and sweep methods were employed to investigate the reaction. The results show that the overall reaction involves four electrons and that the rate of reaction is limited by 1 e transfer in the first step. The reaction was found to be first order with respect to hydrazine and independent of hydroxyl ion concentration in the range, investigated.
CORRELATION OF SOLAR RADIATION AND SUNSHINE DURATION IN RIYADH, SAUDI ARABIA

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(Received January 20, 1973; revised September 4, 1973)

Abstract. This paper presents the measurements of the intensity of incident solar radiation on a horizontal surface and sunshine duration during clear days in Riyadh. These measurements have been studied and presented in tabular and graphical form. Empirical formulae based on sunshine duration are suggested for estimating solar radiation on a horizontal flat-plate.
CURLED-LEAF DISEASE OF PAPAYA TREE

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PLANT PARASITIC NEMATODE FAUNA OF SIND

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A survey of plant parasitic nematodes of Sind region has been undertaken in order to determine their prevalence, host-range and pathogenicity. Although
THE ROLE OF ORGANIC ACIDS IN CONTROLLING THE REACTION OF PHENOL WITH FORMALDEHYDE TO FORM PHENOLIC RESINS

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(Received October 18, 1972; revised September 12, 1973)

Abstract. A study has been made of the acid-catalysed phenol-formaldehyde reactions using ten carboxylic acids of different basicities. It has been observed that the molecular weights of resultant resin seem to be dependent upon the acid concentration a, pK value of the acid and other reaction variables.
SPHEROIDAL-ASBESTOS FROM QILLA, CHARSADDA TEHSIL

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(Received June 25, 1973; revised September 12, 1973)

Abstract. Spheroidal-asbestos has been found near the village Qilla in Charsadda tehsil (Pakistan). The chemical composition, X-ray powder data and DTA show that the asbestos is composed of chrysotile mineral. The genesis of the mineral is also discussed.
A METHOD OF EXTRACTION AND ESTIMATION OF AJMALINE IN DOG’S BLOOD

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(Received April 3, 1973; revised October 3, 1973)

Abstract. A rapid absorptiometric technique has been described for the extraction and estimation of microquantities of ajmaline in dog’s blood. Ajmaline is extracted from serum with ethyl acetate and the red colour of nitroajmaline is measured spectrophotometrically at 510 nm. The method has an accuracy of ±1.0%.