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COMPARATIVE MEASUREMENTS OF THE TEMPERATURE DERIVATIVES OF VISCOSITY, DENSITY AND REFRACTIVE INDEX OF PURE LIQUIDS AND SOLUTIONS

Part I.—Some Dilatometric Measurements on Ethylene Glycol at Intervals of 1°C. to 2°C. in the Range of 20°C. to 80°C.

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Recent work on analysis of the temperature variations of coefficient of dilatation, α , and new measurements on refractive index of water⁷ have shown good correlation with previously reported jumps in activation energy, E_f . In order to elucidate further the physical basis for such behaviour, similar measurements have been made on coefficient of dilatation ($\alpha = \frac{1}{V_0} \frac{\Delta V}{\Delta T}$) of ethylene glycol in the range of 20°-80°C., with temperature intervals $\Delta T = 1^\circ\text{--}2^\circ\text{C}$. A large dilatometer with a calibrated capillary is used, in which a change of 1°C. produces a change of about 40 mm. in the level. With temperature control within 0.002 to 0.005°C., an accuracy of 1 in 400 in α is attainable.

The temperature variation of α shows a nicely undulating regular graph from 30°C. to 75°C., and the mean graph of two sets of measurements exhibits a peak-to-peak amplitude of about 1.2×10^{-5} with a period of 4° to 6°C. The majority of the minima in α correspond closely (within $\pm 1^\circ\text{C}$.) with sharp jumps in E_f/R for ethylene glycol. Some extra minima are also found at 42°, 56° and 67°C., each of which is in the middle of a long "flat" i.e. constant region of E_f/R . Further work on other liquids and solutions is planned.

THE ACTIVITY COEFFICIENTS OF SULPHURIC ACID IN ACETONE-WATER MIXTURES

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The work on the activity coefficient of H_2SO_4 in acetone-water mixture was conducted on the cell. Pt, H_2 (1 atm.) | H_2SO_4 (m), acetone (X%), H_2O (100-X%) | Hg_2SO_4 | Hg. The electromotive forces were measured at eleven different molalities ranging from 0.5 to 1.00m at $32 \pm .05^\circ\text{C}$. To find the standard potentials, extrapolation method was used. Better extrapolation was obtained by plotting ΔE against the square root of molality, as described by Land and Crockford,¹ where ΔE is the difference between the measured e.m.f. for various acid molalities for a given acetone-water mixture and the corresponding values of Harned and Hamer² in water corrected to 32°C . Standard potentials were obtained by subtracting ΔE at zero molality from the standard potential of water at 32°C ., and the values found were 0.5674, 0.5572, 0.5051 and 0.4654 volt at 32°C . for 5, 10, 20 and 40% acetone, respectively. The mean ion activity coefficients were calculated with the help of the equation:

$$E = E^\circ - \frac{3 RT}{2 F} \ln (4^{1/3} m \gamma_{\pm})$$

and the values were found to be lower than those in aqueous solutions at the corresponding molalities.

EVALUATION OF SOME WEST PAKISTAN CLAYS

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Twenty-seven clay samples from different regions of West Pakistan have been studied. The tests include chemical analysis, infrared absorption analysis, plasticity, water of plasticity, drying and firing behaviour including shrinkage, water absorption and colour. The majority of these clays have been found suitable for different uses in the ceramic industry.

A STUDY OF A SWAT KAOLINITE

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A recently discovered Swat clay has been studied with a view to determine the physical properties like plasticity, water of plasticity, drying and firing shrinkage, water absorption and reflectance; and chemical analysis, differential thermal analysis, infra-red absorption analysis, spectrographic analysis and pyrometric conc equivalent. Results indicate it to be a kaolinite of an excellent quality suitable for making high grade ceramics and porcelain, paper making and various miscellaneous industries.

ELECTROLYTIC POLISHING OF ALUMINIUM

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West Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Lahore

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A new electrolyte for electrolytic polishing of aluminium has been developed. The polishing is accomplished under controlled conditions in a mixture of sodium hydroxide, metaphosphoric acid and glycerine. A bright and glazy surface is developed after three to four minutes. Sulphuric acid can be used for subsequent anodizing.

SOME TECHNOLOGICAL ASPECTS OF THE CHLORINATION OF DAUDKHEL 'GASOLINE'

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'Gasoline' a waste industrial product from ammonium sulphate industry, has been chlorinated to obtain a pesticide named as Makrolin. Chlorine gas-rates when increased from 50 to 150 litres/hr/250 ml. of the 'gasoline', lower the first-stage chlorination period from 1.192 to 0.634 hours but do not appear to have any effect on the second-stage of chlorination. Caustic soda when used in 0.5 to 4 percent concentration lowers the overall period of chlorination from 44 to 22 hours. Higher concentration namely 5 to 10 percent do not further reduce the chlorination period. Catalytic chlorination in presence of anhydrous ferric-chloride (0.2 g. Fe/250 ml. of the partly chlorinated 'gasoline') has been found useful in reducing the overall chlorination period down to 24 hours. The aqueous phase separated after the chlorination contains about 20-30 g. of hydrochloric acid per 100 ml. of the solution which can be used as pickling-agent.

SOME USEFUL PRODUCTS BASED ON EPOXY RESINS

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Some useful industrial and engineering materials like high temperature anticorrosion linings, universal flooring for chemical plants, grinding stones and fire resistant coatings on wood have been made from epoxy resins. Steel and iron have been metallized with Zn, Tin and Al using new technique based on these resins.

ORGANIC PEROXIDES**Part VIII.—Reactions of Dibenzoyl Peroxide and t-Butyl Perbenzoate with Grignard Reagents and Phenyllithium**J.T. EDWARD AND S.A. SAMAD[†]*Department of Chemistry, McGill University, Montreal*

(Received November 16, 1963)

Dibenzoyl peroxide and t-butyl perbenzoate are allowed to react with phenyllithium and several Grignard reagents. The yields of benzoyloxy substitution by these Grignard reagents varied between 15-44%. Phenyllithium appeared to be markedly inferior for similar substitution.

ANATOMICAL CHARACTERS DIFFERENTIATING CRAWLING LARVAE OF MALE AND FEMALE LAC INSECTS

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A lac crop depends entirely on the presence of females in the generation. The body outlines of the two sexes in the crawling larval stage shows a difference. This requires morphological or anatomical characters to confirm sex differentiation. The lac insects have two brachial plates as a feature special to them. In the centre of this structure is a cluster of pores secreting wax. These pores are on the two brachia number 14 in the female, and 7 in the male larva. This anatomical finding confirms the observation that the female larva secretes more soft wax filaments than does the male.

EARLY DEVELOPMENTAL STAGES OF LEPTODIUS EXERATUS (MILNE EDWARDS)

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AND

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(Received December 28, 1963).

Early development stages of *Leptodius exeratus*, reared in the laboratory have been described. Stages of egg till the time of hatching have also been studied. Prezoca, first zoea and second zoea have been illustrated and described.

PESTICIDAL POTENTIALITY OF PETKOLIN IN COMPARISON WITH OTHER CHLORINATED INSECTICIDES

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Pesticidal action of Petkolin, a petroleum based chlorinated insecticide, has been studied by using topical application method against cockroaches and house flies. The LD₅₀ was found to be in the range of 64 to 96 micrograms per cockroach and 8 to 20 micrograms per fly. Against mosquito larvae, LC₅₀ was in the range of 5 to 8 p p m. and LC₉₅ in the range of 8.5 to 15 p p m. Petkolin was more toxic than Makrolin against house flies and mosquito larvae, but less toxic against cockroaches.

PHARMACOLOGY OF THE CRUDE EXTRACT OF ANONA SQUAMOSA, (SHARIFA)

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The pharmacology and toxicology of the water soluble portion of the alcoholic extract of the leaves of *Anona squamosa* (Sharifa) has been studied. The extract was found to stimulate the isolated rabbit heart, relax the isolated rabbit duodenum and raise the blood pressure of anaesthetised animals. It also caused a contraction of the nictitating membrane of the cat. The actions were very similar to those produced by adrenaline. Adrenergic blocking agents like dibenamine and ergotamine completely blocked and reversed the pressor response of the extract.

The results indicate that the active substance is very similar to adrenaline in its pharmacological actions.

SHORT COMMUNICATION

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CONSTITUENTS OF CASSIA ABSUS LINN

Isolation and Characterization of a Glycoside from the Seeds

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STRUCTURE OF ORGANOSELENOCYANATES

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MANGHOPIR SPRING WATERS

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STUDIES OF THE CITRATE COMPLEX OF BARIUM

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TITRATION OF BERYLLIUM IN GLACIAL ACETIC ACID

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(Received October 26, 1963)

PROTEOLYTIC DECOMPOSITION OF FISH MUSCLE PROTEINS UNDER DIFFERENT CONDITIONS

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**METHOD OF DETECTION OF PIRICULARIA ORYZAE AND HELMINTHOSPORIUM
ORYZAE, ON MALT AGAR***

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