

## ABSTRACTS

### DEPARTMENT OF GENERAL CHEMISTRY

1. POLAROGRAPHIC BEHAVIOUR OF THIONATES. R. S. Subrahmanya, *Proc. Ind. Acad. Sci.*, 1955, **42 A**, 267.

The polarographic behaviour of the thionates has been studied employing potassium iodide, potassium chloride, hydrochloric acid and various buffers as electrolytes in the base solutions. The effect of incorporating 50% alcohol in the base solution has also been investigated. The results indicate that the reduction process is essentially an irreversible process with tri- and tetra-thionates while the opposite effect is noticed with pentathionate. The tetrathionate shows the phenomenon of split wave which is practically absent in trithionate solutions. A method has been suggested for the estimation of thionates in a mixture based on the use of 50% alcohol in the base solutions. The mechanism of the reduction process has been discussed.

2. SPECTROPHOTOMETRIC ESTIMATION OF THORIUM BY MORELLIN. B. R. Lakshman Rao and C. C. Patel, *Proc. Ind. Acad. Sci.*, 1955, **42 A**, 317-25.

The spectrophotometric estimation of thorium has been standardised by employing morellin, which forms an orange-red complex with thorium in alcoholic medium. The complex obeys Beer's law at  $515m\mu$  in the range 1.4 to 25 p.p.m. of thorium. Effect of pH on the complex has been studied and it is found that the complex is stable between the pH 5 and 7. Employing Job's method of continuous variations and the slope ratio method of Harvey and Manning (1950), molar composition of the complex is determined. Morellin to thorium mole ratio in the 8 co-ordinate inner complex of thorium is 4:1. Limits of tolerance of more than 30 interfering salts during the estimation of thorium have been determined.

3. PEROXIDE OF TITANIUM. D. P. Kharkar and C. C. Patel, *Curr. Sci.*, 1955, **24**, 413-14.

Hydrated peroxide of titanium is precipitated by addition of ammonia to an aqueous mixture of titanium tetrachloride and hydrogen peroxide. The keeping quality of the washed precipitate has been studied and it is shown that the freshly prepared peroxide has the composition  $TiO_3$ , which on keeping gradually loses its peroxy oxygen, converting itself into  $Ti_2O_5$  and finally to titanium dioxide. The peroxide (pertitanic acid) is given the structural formula



## PHARMACOLOGY LABORATORY

1. STUDIES ON THE NUTRITIVE VALUE OF *Cucurbita pepo*. P. R. J. Gangadharam and M. Sirsi, *Indian Journal of Pharmacy, Bombay*, 1955, **17**, 133.

The nutritive value of supplementing the pulp of *Cucurbita pepo* on the growth of rats has been made and shown that there is a marked improvement in the growth rate. The significance of the results are discussed in relation to chemical composition.

2. ANNUAL REVIEW OF BIOCHEMICAL AND ALLIED RESEARCH IN INDIA. M. Sirsi and G. Werner, *Review on Pharmacology*, 1955, **25**, 109.

Research activities in Pharmacology carried out in India during the year 1954 has been reviewed.

3. OBSERVATIONS ON THE PHARMACOLOGY OF *Rauwolfia* ALKALOIDS. C. N. Shaw and M. Sirsi, *Journal of the Mysore Medical Association*, 1955, **20**.

Investigations on some pharmaco-dynamic properties of Crude total alkaloids of *Rauwolfia serpentina* have shown that these alkaloids possess both peripheral adrenolytic and central depressant action, unlike reserpine, which does not exhibit any peripheral adrenolytic activity.

4. ANTI-BACTERIAL ACTIVITY OF *Rauwolfia* ALKALOIDS. M. Sirsi and M. O. Tirunarayanan, *Curr. Sci.*, 1955, **24**, 185.

The anti-bacterial activity of Crude alkaloids of *Rauwolfia serpentina* has been investigated. The results show that the alkaloids are active against several organisms, including *Staphylo aureus* and *Shigella sonne*, but is inactive against *Mycobacterium tuberculosis*.

## FERMENTATION TECHNOLOGY LABORATORY

1. ROLE OF IRON IN THE NUTRITION AND METABOLISM OF *Clostridium lacto-acetophilum*. J. V. Bhat, *Archiv für Mikrobiologie*, 1955, **23**, 142-45.

Iron as a minor element has been shown to be indispensable in the nutrition of *C. lacto-acetophilum* by demonstrating its need for the early growth of the organism as well as for the appearance of its optimal growth. Progressive elimination of iron from an otherwise suitable medium has been proved to render the medium unsuitable for the growth of the *Clostridium*.

Iron has also been shown to play a part in the oxidation of lactate to acetate as well as in the formation of butyrate, a condensation product of acetate. In the absence of adequate amounts of iron, lactate has been shown to accumulate as a product in the fermentation of glucose by this organism.

2. STUDIES ON TRANSAMINASE AND DECARBOXYLASE CATALYSED BY EXTRACTS OF THE SILKWORM *Bombyx mori*, L. Bheemeswar, *Nature*, 1955, **176**, 555-56.

The discovery of an enzyme system in the glands of the silkworm, *Bombyx mori* L., capable of converting aspartate into  $\alpha$ -alanine has been announced. The significance of this enzyme from the point of view of the synthesis of silk fibroin has been indicated. The mechanism has also been pointed out as still another means by which the insect synthesises ( $\alpha$ -alanine), a major constituent of the silk.

#### DEPARTMENT OF PHYSICS

1. RAMAN SPECTRUM OF CRYSTALLINE CADMIUM SULPHATE. T. S. Krishnan and P. S. Narayanan, *Proc. Ind. Acad. Sci.*, 1955, **42 A**, 121.

The Raman spectrum of a single crystal of cadmium sulphate ( $3\text{CdSO}_4 \cdot 8\text{H}_2\text{O}$ ) has been investigated using the resonance radiation of mercury as exciter. The recorded spectrum reveals 23 Raman lines and of these 8 have been attributed to the internal oscillations of the  $\text{SO}_4$  ion and 2 to the oscillations of the water molecules. While the number of translatory type of lattice oscillations permitted by the selection rules is 36, only 13 are observed experimentally. A tentative assignment of some of these vibrations has been made from a study of the variation of intensity of the lines with orientation.

2. RAMAN SPECTRA OF HYDROCARBON CYPERENE - II. T. A. Hariharan and Radomir Senich, *Proc. Ind. Acad. Sci.*, 1955, **42 A**, 285.

The Raman spectra of cyperene II isolated from the hydrocarbon fraction of the oil from weed plant has been studied along with its partially hydrogenated product, dihydrocyperene II and fully hydrogenated product tetrahydrocyperene II. The spectra indicate the presence of two double bonds in cyperene II, one double bond in dihydrocyperene II and no double bond at all in tetrahydrocyperene II. The nature of these double bonds in relation to the observed spectra has been discussed.

3. RAMAN SPECTRUM OF CAESIUM BROMIDE. P. S. Narayanan, *Proc. Ind. Acad. Sci.*, 1955, **42 A**, 303.

The Raman spectrum of caesium bromide, which crystallises with CsCl structure, has been studied using the resonance radiation of mercury as exciter. It consists of a number of lines very close to the exciting line of which five prominent frequency shifts are 79, 107, 135, 155 and  $190 \text{ cm}^{-1}$ . A calculation of the 7 distinct frequencies of CsBr using the approximate formulae worked out by K. G. Ramanathan on the basis of Raman's theory has been carried out and an attempt made to explain the prominent features of the observed spectrum.

4. PARAMAGNETIC RESONANCE IN SOME CUPRIC SALTS. (Miss) K. Sundaramma, *Proc. Ind. Acad. Sci.*, 1955, **42 A**, 292.

This paper is a report of the study of the paramagnetic resonance spectra of six cupric salts. Data for cupric oxalate, cupric sodium oxalate, cupric potassium oxalate and cupric ammonium oxalate in the powder form have been

obtained. Single crystals of cupric ammonium oxalate dihydrate and cupric formate tetrahydrate have been investigated for anisotropy of  $g$ -value and line-widths. No resonance was observed in cupric butyrate monohydrate in the magnetic field ranging from 0 to 4,500 gauss in the region of 3 cm. Structure of the crystals are discussed in relation to the magnetic properties of the same.

5. THERMAL EXPANSION OF NITRATES OF LEAD, BARIUM AND STRONTIUM.  
R. Srinivasan, *Proc. Ind. Acad. Sci.*, 1955, **41 A**, 49.

The expansion coefficients of barium, strontium and lead nitrates have been studied above room temperature. Lead nitrate decomposes rapidly beyond 200° C. while crystals of barium nitrate crack above 270° C. Strontium nitrate exhibited no such phenomena till 550° C.

These crystals are isomorphous. The expansion coefficients of lead and strontium nitrates are nearly equal; they also possess the same ionic radii. Barium nitrate has a considerably smaller expansion coefficient though its ionic radius is larger than that for the other two. This peculiar behaviour in barium nitrate indicates a stronger binding in this crystal—a fact corroborated by measurements on the elastic constants, Raman effect, solubilities of these salts, etc.

6. THE THERMAL EXPANSION OF CALCITE FROM ROOM TEMPERATURE UP TO 400° C.  
R. Srinivasan, *Proc. Ind. Acad. Sci.*, 1955, **42 A**, 81.

The thermal expansion of calcite along and perpendicular to the optic axis was measured from room temperature up to 400° C.  $\alpha_{\parallel}$  increased with increasing temperature, while  $\alpha_{\perp}$  which is negative, decreases in magnitude with increasing temperature. The high temperature curves join up well with the low temperature curves of Adenstadt. The Gruneisen constant is shown to vary with temperature in the usual manner. Its small value points to a valence type of binding in this crystal—a fact supported by the intense Raman effect and dielectric polarisability of calcite.

7. THERMAL EXPANSION OF POTASSIUM IODIDE. R. Srinivasan, *Proc. Ind. Acad. Sci.*, 1955, **42 A**, 255.

The thermal expansion of two different specimens of potassium iodide was measured from liquid air temperature up to 150° C. One specimen was melt-grown in our laboratory and the other was supplied by Harshaw Chemical Co.

The expansion coefficient for the two specimens above room temperature are identical with one another. The high temperature expansion was not influenced by heat or cold treatment of the specimens.

Below 0° C. the thermal expansion of potassium iodide exhibits an anomalous behaviour. Two maxima at -95° and -40° C. and two minima at -60° and -25° C. have been observed. As the length of the specimen varies continuously with temperature, the transition in the crystal appears to be, homomorphous.

8. DETERMINATION OF THORIUM AND URANIUM CONCENTRATION RATIOS OF INDIAN ROCKS AND MINERALS. V. Seetharam Aithal, *C.S.I.R. Journal*, 1955, **14 B** (10), 519-23.

Thorium-Uranium concentration ratios in ten samples of rocks and minerals have been determined by employing the range of the alpha-particles emitted by Thorium and Uranium with a scintillation counter. The method of measurement and characteristics of scintillation counter employed are discussed.