

solution and subsequent heating for a short time, to activate it, the colour effect with benzene and carbon tetrachloride mixture was displayed. The gel containing sulphate was strongly ignited to decompose the sulphate. The ignited gel produced no colour. So it is definite that sulphate in alumina has an important role in producing the black colour.

In place of carbon tetrachloride in the mixture several halogen derivatives, such as (1) Methylene chloride, (2) Chloroform, (3) Tetrachlorethene, (4) Chlorobenzene, (5) Benzyl chloride, (6) Bromoform, (7) Ethylene dibromide, (8) Bromobenzene were used in combination with benzene. A mixture containing benzene and a halogen derivative would always show the colour effect. Having a trace of green or violet in some cases, the colours in different mixtures slightly differed from one another. The effect is of a general character, in being produced always in a mixture containing an aromatic nucleus and a halogen derivative.

The development of colour is gradual. The activated opaque gel on being dropped into benzene and carbon tetrachloride mixture first becomes yellow which changes over to orange red, greenish brown and finally black.

When the blackened gel is dropped into water the colour disappears. This is obviously due to the preferential adsorption of water by the gel surface. After treatment with water, the gel is white as before and the supernatant liquid colourless.

The mechanism of the development and the display of the colours is probably the formation of an adsorption complex and a precursor to the well-known Friedel and Crafts' reaction.

It is known that the characteristic absorption, of an aromatic compound shifts, on halogenation of the nucleus, from the ultra-violet towards the visible. This is probably a case of loading of the aromatic nucleus with halogen,² brought about by alumina-sulphate. A study of the absorption spectra of the system at various stages of development of this colour effect

may throw light on the nature of this interesting phenomenon. Investigations on this line are in progress.

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December 12, 1941.

¹ Rao, K. S., and Rao, B. S., *Proc. Ind. Acad. Sci.*, 1936, 4, 562.

² Suggestion by Sir C. V. Raman in a private discussion.

RAMAN SPECTRA OF 2-HYDROXY 4-METHOXY-BENZALDEHYDE

THE above substance was isolated as a white solid from the roots of *Decalepis Hamiltonii* (Kannada name, *Makaliberu*).¹ It consists of colourless rectangular platy crystals belonging to the monoclinic system.

As 4-methoxy- β -resorcyraldehyde is highly soluble both in carbon tetrachloride and glacial acetic acid, a study of its Raman spectra has also been attempted. The solutions however turn yellow after a time and the consequent absorption of the HgI λ 4358 A° decreases the efficiency of this radiation in producing Raman lines. Long exposures have however revealed two faint Raman lines at 1655⁽⁴⁾ and 1215⁽³⁾ cm.⁻¹ in a 30 per cent. solution of the substance in carbon tetrachloride. The solution in glacial acetic acid showed a few more lines (even fainter) with frequency shifts of 280⁽¹⁾, 340⁽¹⁾, 715⁽⁰⁾, 820⁽⁰⁾, 1345⁽¹⁾, 1450⁽¹⁾ and 3300⁽²⁾ cm.⁻¹ The lines observed in carbon tetrachloride solution appeared stronger. As the light gathering power of spectrograph employed is small, and the solution is coloured, the Raman frequencies of the substance are, it is felt, necessarily incomplete. The substance exhibits a weak fluorescence in consequence of which the Raman lines are superposed on a continuous background which extends from longer wave-lengths right up to about 800 cm.⁻¹ from λ 4358 A°.

I wish to acknowledge with thanks the help given to me by Dr. L. Sibaiya in the spectroscopic portion of the work.

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December 8, 1941.

¹ Srinivasa Rao and Sesha Iyengar, *Perf. Essent. Oil. Rec.*, 1923, 14, 300.

EFFECT OF COMMON ION ON THE ELECTROLYTIC DISSOCIATION OF SOME STRONG ELECTROLYTES

DURING the course of investigations on the electrolytic dissociation by the mechanism of Raman effect, a study of solutions of strong electrolytes as influenced by the addition of some other strong electrolytes with a common ion has revealed the following phenomena.

1. The variations in the intensity of the 1045 line characteristic of HSO_4' ions indicate that the degree of dissociation of sulphuric acid diminishes by the addition of other acids, which supply H^+ ions in abundance, e.g., HClO_4 and HCl .

2. The variations in the intensity of the 1300 line arising out of the undissociated HNO_3 molecules show that the dissociation of nitric acid is suppressed by the addition of other acids, e.g., HClO_4 , H_2SO_4 and HIO_3 .

3. The dissociation of HSO_4' ions into H^+ and SO_4'' ions in a solution of a bisulphate, e.g., NH_4HSO_4 is also found to decrease by the addition of HCl .

In all the above cases, the dissociation is diminished by increasing the proportion of the H^+ ions.

1. The dissociation of HNO_3 is found to increase by the NO_3' ions supplied by NH_4NO_3 .

2. The dissociation of HSO_4' into SO_4'' and H^+ ions in a solution of a bisulphate is found to increase with the addition of SO_4'' ion supplied by a sulphate. This is tested in the case of mixtures of $\text{NH}_4\text{HSO}_4 + (\text{NH}_4)_2\text{SO}_4$, $\text{KHSO}_4 + (\text{NH}_4)_2\text{SO}_4$ and $\text{NH}_4\text{HSO}_4 + \text{Li}_2\text{SO}_4$.

It appears from the above results that while

the behaviour of the additional H^+ ions is in conformity with the law of mass action, the anion gives results just opposed to this law. It is well known that the law of mass action does not hold for concentrated solutions of strong electrolytes, as the constant is found to vary with concentration. But, the result entirely opposed to the law obtained with the addition of the anion was never contemplated before.

Further work with other electrolytes is in progress to permit of a generalisation as to the applicability of the law of mass action to strong electrolytes.

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CRYSTALLISATION OF SOAP

It is extremely difficult to produce crystals of alkali metal soaps (sodium palmitate, sodium stearate, etc.), though sometimes a very small amount is found to have spontaneously crystallised out of ordinary soap (technically known as 'figging' of soap) or out of aqueous soap jellies. Lawrence¹ has shown that though soaps of the very unsaturated acid like stearolic acid form microscopic crystals, the soaps of the saturated acids show it in the ultramicroscopic region. However, crystals of the acid soaps of the fatty acids can be readily prepared and McBain has published photographs of crystals of potassium hydrogen dioleate² and of sodium hydrogen dipalmitate³ formed inside the melt of a mixture of neutral soap and fatty acid. McBain⁴ holds that solid soap may be of two types, (i) lamellar crystals or (ii) soap curd, the latter being the more common and ordinarily producible. Of course, the soap curd fibres are really crystalline, having three-dimensional crystal regularity as indicated by X-ray evidence, though under the highest magnification even with the electron microscope, no trace of definite crystal faces are seen.⁵ Thiessen and Stauff,⁶ however, succeeded in producing a few crystals of sodium