[Jour. Indian Chem. Soc., Vol. 25, No. 10, 1948]

A NOTE ON MIXED INDICATORS IN ALKALIMETRIC TITRATION

By K. V. S. Krishnamurty

Simpson (*Ind. Eng. Chem.*, 1924, **16**, 709) introduced a great simplification in the titration of carbonate to the bicarbonate stage with his new mixed indicator consisting of 6 parts of Thymol blue and 1 part of Cresol red. It seemed of interest to investigate if other indicators of this type may be found. Amongst many combinations tried, the following have yielded useful results. In a few cases the end-point is much more sharp than with Simpson's indicator. Aliquot parts of a $N/10$ solution of pure sodium carbonate, obtained by heating Analar sodium carbonate to constant weight at 300° for 2 to 4 hours, were titrated to the bicarbonate stage; then varying quantities of solid bicarbonate were added to the carbonate solution and the carbonate was determined by titration to the bicarbonate stage. The results are tabulated below. In all cases two or three drops of the indicator were added and the liquid diluted to 100 ml.

Table I

Soln. taken = 30 ml. of $N/10$-$Na_2CO_3 \equiv 15$ ml. of $N/10$-HCl.

Indicator strength = 0.1%

	Indicator.	Initial colour.	Colour at end-point.	Vol. of $N/10$-HCl required (average)	Remarks
1.	Simpson's	Purple	Rose	15.00 ml.	Sharp
2.	Tropoelin 000 No. 1 & Malachite green (1:1)	Dark purple	Bluish green or green	15.00	Very sharp
3.	Tropoelin 000 No. 1 & Thymol blue (1:1).	Pink	Orange	15.05	Not very sharp, slow.
4.	Thymol blue & Phenol red (1:1)	Dark pink	Orange	15.00	Sharp
5.	Thymol blue & Neutral red (1:1)	Purple blue	Light orange to yellow	15.05	Fairly sharp

Experiments (not quoted here) show that sodium carbonate may be very conveniently titrated in the presence of a large excess (even 20 times) of bicarbonate down to all concentrations up to $N/200$. With small amounts (2 ml.) of the carbonate solution the results are very irregular. Any quantity above 5 ml. gives accurate results. Indicator No. 2 falls strictly under the category of screened indicator. Further work is in progress on the determination of p_K values for these indicators.

The author's best thanks are due to Dr. Bh. S. V. Raghava Rao of the Andhra University for suggesting the work and taking further interest.

Department of Chemistry,
V. R. College, Nellore.

Received June 2, 1948.

[Jour. Indian Chem. Soc., Vol. 25, No. 10, 1948]

A STUDY OF NEW OXIDATION-REDUCTION INDICATORS

By V. BRAHMAJIRAO

In the wake of the introduction of diphenylamine by Knop as an internal indicator in oxidation-reduction titrations, a large number of similar indicators have been suggested from time to time, such as *para*-phenetidine, diphenylbenzidine, *ortho*-phenanthrolene sulphate, N-phenylanthranilic acid and xylene cyanolFF. Raghavarao (*Curr. Sci.*, 1947, **16**, 378) recently suggested the use of Rhodamine 6G for some titrations with ceric sulphate. In the present work the author reports the results of a somewhat detailed investigations of xylene cyanolFF and Rhodamine 6G with various oxidants.

Contrary to the claim of Mitchell and Ward ("Modern Methods in Quantitative Chemical Analysis", Green and Co., London, 1932, p. 16) that xylene cyanol FF is perfectly reversible in titrations with ceric sulphate, the author has found that the indicator undergoes irreversible oxidation by a slight excess of ceric sulphate. The original colour is not restored even after the addition of excess of ferrous salt. Moreover, the author has found that xylene cyanolFF does not form a suitable indicator for the titration of ferrous salts by potassium dichromate or sodium vanadate.

Raghavarao has suggested the use of three or four drops of a 0.1% aqueous solution of Rhodamine 6G for titration of about 50 ml. of ferrous salt solution by ceric sulphate. The mixture shows a crimson-red colour with a marked fluorescence. A very slight excess of ceric sulphate changes the colour sharply from red to orange with simultaneous extinction of fluorescence. The author has confirmed the claim of Raghavarao that the end-point with this indicator is much sharper than with diphenylamine or diphenylbenzidine. However, it has been found that Rhodamine 6G is not suitable for titrations with potassium dichromate, potassium permanganate and sodium vanadate. This is due to the fact that the indicator becomes irreversibly oxidised by potassium permanganate, potassium dichromate and sodium vanadate, with ferric ions acting as catalysts. The author has also noticed that Rhodamine 6G is also destroyed by iodine monochloride, a reagent which is occasionally employed as a catalyst in oxidation-reduction titrations.

In conclusion the author wishes to express his sincere thanks to Prof. G. Gapalarao, D. Sc., for the valuable suggestions given and for the keen interest taken.

CHEMISTRY DEPARTMENT,
MRS. A. V. N. COLLEGE,
VIZAGAPATAM.

Received May 25, 1948.