or was contaminated with selenium dioxide. No further attempts were made to purify this substance.

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The Apparent Molal Volume of Barium Chloride in Ethanol–Water Mixtures

BY RICHARD LOUIS BATEMAN

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A previous publication[1] gave the density and apparent molal volume of strontium chloride in ethanol–water mixtures with a discussion of the results. The present report concerns the density and apparent molal volume of barium chloride in ethanol–water mixtures at 25.00°. The apparent molal volume of barium chloride in aqueous solutions at 25° has been reported by Geffcken[2] and at 35° by Chacravarti and Prasad.[3]

TABLE I

APPARENT MOLAL VOLUME OF BARIUM CHLORIDE IN ETHANOL–WATER MIXTURES AT 25°

Molality of $BaCl_2$	Density of soln., g./ml.	Vol. of soln. per 1000 g. solvent, ml.	Apparent molal vol. $BaCl_2$, ml.
	0% Ethanol		
0.5	1.08545	1017.21	28.56
.4	1.06812	1014.21	28.20
.3	1.05066	1011.25	27.73
.2	1.03304	1008.35	27.10
.1	1.01513	1005.59	26.60
.05	1.00615	1004.22	25.80
0	0.99708	1002.93	
	20% Ethanol		
0.5	1.05159	1049.97	30.38
.4	1.03501	1046.67	29.72
.3	1.01818	1043.51	29.10
.2	1.00122	1040.38	28.00
.1	0.98400	1037.42	26.40
.05	.97534	1036.01	24.60
0	.96639	1034.78	
	40% Ethanol		
0.5	1.01151	1091.57	36.02
.4	0.99590	1087.75	35.47
.3	.98005	1084.11	35.17
.2	.96410	1080.44	34.40
.1	.94794	1076.88	33.20
.05	.93985	1075.08	30.40
0	.93148	1073.56	
	50% Ethanol		
0.2	0.94141	1106.49	37.05
.1	.92584	1102.60	35.20
.05	.91791	1100.79	34.20
0	.90985	1099.08	
	60% Ethanol		
0.17710	0.91442	1133.91	36.70
.1	.90273	1130.81	34.00
.05	.89496	1128.99	31.60
0	.88699	1127.41	

(1) R. L. Bateman, THIS JOURNAL, **71**, 2291 (1949).
(2) W. Geffcken, *Z. physik. Chem.*, **A155**, 12 (1931).
(3) A. S. Chacravarti and B. Prasad, *Trans. Faraday Soc.*, **35**, 1469 (1939).

For the same solvent, the apparent molal volume of barium chloride is greatest in the more concentrated solutions. In the more dilute solutions, with the same solute concentration, the molal volume reaches a maximum in about 50% ethanol and a minimum in about 10% ethanol in the solvent.

Experimental

Conductance water was prepared by the redistillation of water containing a little potassium permanganate through a block tin condenser and saving only the middle fraction. At 25° the specific conductance of this water was 1.0×10^{-6} ohm^{-1} $cm.^{-1}$.

Ethanol was purified by treating 95% ethanol by the method of Kiczales.[4] The purified ethanol was 99.9% absolute and at 25° the specific conductance was 2.0×10^{-5} ohm^{-1} $cm.^{-1}$.

J. T. Baker C.P. $BaCl_2 \cdot 2H_2O$ was twice recrystallized from conductance water and oven-dried to constant weight.

Ethanol–water solvents were prepared by the weight method and the exact composition determined by density measurement and interpolation with the density values from the "International Critical Tables."

Barium chloride solutions in ethanol–water mixtures were prepared from anhydrous barium chloride by the weight method and the concentrations were expressed as gram-moles per 1000 g. of solvent.

Weights were standardized against a Bureau of Standards certified set and all weighings were corrected to vacuum.

The bath temperature was constant to within 0.01° and was determined by a Beckmann thermometer that had been standardized against a thermometer certified by the Bureau of Standards.

Density determinations were made at each concentration with two pycnometers, one of 45.7941 ml. the other of 46.1905 ml., calibrated with water as a standard and considering the density of water at 25.00° as 0.9970739 g./ml. Each value given in the table was the average of two independent determinations that were interpolated to "round" solvent composition and solute concentration. Limited solubility in the strongly alcoholic solutions confined the determinations to solvents containing 60% or less ethanol.

The results are summarized in Table I. The ethanol percentages are weight percentages ethanol in the solvent.

(4) S. Kiczales, *Ind. Eng. Chem.*, **20**, 493 (1928).

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Identification and Properties of the Colored Compound Formed in Parathion Estimations[1]

BY R. C. BLINN, F. A. GUNTHER AND M. J. KOLBEZEN

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With the widespread use of the insecticidal material O,O-diethyl O-*p*-nitrophenyl thiophosphate (parathion) has coincided the development and exploitation of a sensitive method for its quantitative estimation upon foodstuffs.[2] This method is based upon the quantitative reduction of the nitro to the amino group with subsequent diazotization and coupling with N-1-naphthylethylenediamine to produce an intense magenta color. It has been established[3] that various substituted nitrobenzenes or anilines also give magenta colors

(1) Paper No. 732, University of California Citrus Experiment Station, Riverside, California. Presented at the 121st Meeting of the American Chemical Society, Milwaukee, Wisconsin, April, 1952.

(2) (a) P. R. Averell and M. V. Norris, *Anal. Chem.*, **20**, 753 (1948); (b) F. A. Gunther and R. C. Blinn, *Advances in Chemistry Series*, **1**, 72 (1950); (c) J. C. Gage, *Analyst*, **75**, 189 (1950).

(3) (a) F. I. Edwards, Jr., *Anal. Chem.*, **21**, 1415 (1949); (b) R. C. Blinn and F. A. Gunther, *ibid.*, **22**, 1219 (1950); (c) M. V. Norris and P. R. Averell, private communications.