Uranyl Sulfate B. A variance analysis of the results (Table II) indicated that the data give no justification for assuming linearity. Since measurements were made at four temperatures, the means of these temperatures and the 95% confidence limits of the true means were calculated and are given in Table III. The point-to-point variability for these data is 0.203×10^5. The mean Henry's law constants are plotted as a function of temperature in Figure 7 with a line drawn through the mean values. The constant for the temperature extremes (100° and 300° C.) are $6.14 \pm 0.26) \times 10^5$ and $(1.09 \pm 0.23) \times 10^5$ p.s.i.a. per mole fraction.

OXYGEN

The oxygen solubility data for the measurements in which 3.5 or more hours were allowed for reaching equilibrium are given for the three solvents in the form of Henry's law constant in Table II. The constants for less than 3.5 hours are not considered, since it is believed that this is a minimum period for reaching oxygen equilibrium. The oxygen partial pressures varied from 56 to 918 p.s.i.a. The homogeneity of the oxygen data for the three solvents was examined using a variance ratio test. The two measures of variability were the variation of the means for solution within temperature and run to run variation within temperature and solution. The analysis indicated that the solubility was not affected by the solvent. Therefore, the means constant and 95% confidence limits were calculated, neglecting the solvent parameter, for various temperatures (Table II and Figure 8). The standard deviation of point-to-point variation is 0.267×10^5. It is readily seen that the constant is not a linear function of temperature and that the 95% confidence limits include the solubility values reported by Battelle for oxygen in water. This confirmed, within the limits of the data, the values reported by Battelle.

ACKNOWLEDGMENT

The authors express their gratitude for the valuable assistance given by D.E. Ferguson and R.A. McNees of ORNL. Thanks are also given to R.V. Laue for statistical analysis of the data.

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RECEIVED for review July 18, 1961. Accepted November 20, 1961. Research supported by Oak Ridge National Laboratory. Operated for the U. S. Atomic Energy Commission by the Union Carbide Nuclear Co. (Subcontract 535 under UCNC Prime Contract W-7405-eng-26).

Solubility of Iodine in Dimethylsulfoxide

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SOLUBILITY of iodine in dimethylsulfoxide (DMSO) has been measured at temperatures from 27° to 38° C. The results are reported in Table I.

EXPERIMENTAL

Dimethylsulfoxide (Stepan Chemical Co., Chicago, Ill.) was distilled once before use. Resublimed iodine from Fisher and Mallinckrodt was used without further purification. Anhydrous sodium thiosulfate (Fisher certified reagent), potassium iodide (Baker analyzed reagent), and Thyodene indicator (Fisher) were also used without further treatment.

Two-milliliter samples of dimethylsulfoxide were placed in large test tubes, saturated with excess iodine, and the test tubes sealed by a flame. The tubes were then placed in a Precision temperature bath (±0.02°) equipped with a mechanical shaker for time intervals varying from 2 days to 4 weeks.

Table I. Solubility of Iodine in Dimethylsulfoxide

T, ° K.	x_2, Mole Fraction of Iodine
300.2	0.550
301.3	0.556
303.2	0.563
305.2	0.569
307.2	0.573
309.2	0.578
311.2	0.579

A 1-ml. aliquot of the equilibrated solution was added to a previously weighed amount of potassium iodide solution. The iodine-dimethylsulfoxide-potassium iodide solution was weighed, and the weight of the aliquot was determined by difference. In order to determine the amount of iodine, the iodine-dimethylsulfoxide solution in potassium iodide was titrated with standard thiosulfate solution using Thyodene as an indicator. The average precision of the results was approximately 1%.

Each value, except those at 27°, 32°, and 36°, represents an average of seven determinations. Nine determinations were made at 36° and 10 at the other two temperatures.

DISCUSSION

The solubilities presented in Table I were fitted to the equation

$$\ln x_2 = -433.2/T + 0.8511$$

by the method of least squares using an IBM 650 digital computer. The differential heat of solution of iodine from these data is 861 ± 3 cal. per mole.

ACKNOWLEDGMENT

The authors thank both The Graduate Council, for special funds given to W.J. Jones, and the Computing Center, of Southern Illinois University, for use of their facilities.

RECEIVED for review July 13, 1961. Resubmitted November 9, 1961. Accepted December 14, 1961. Presented in part at the 52nd Annual Meeting, Illinois State Academy of Science, Chicago, Ill., April 24, 1959.