Ester	Scale Reading	Mol. Wt.	Ester	Scale Reading
Methyl acetate	12.00	74	Ethyl formate	12.74
Ethyl acetate	12.50	88	Ethyl acetate	12.50
Propyl acetate	12.97	102	Ethyl propionate	11.93
Butyl acetate	13.39	116	Ethyl butyrate	11.54
Amyl acetate	13.60	130	Ethyl valerate	11.42
		144	Ethyl caproate	10.32
Heptyl acetate	14.11	158	Ethyl heptylate	8.50
		172	Ethyl caprylate	5.50
		186	Ethyl pelargonate	3.26
		200	Ethyl caprate	0.89
Isopropyl acetate	12.97	102		
Isobutyl acetate	13.39	116		
Isoamyl acetate	13.60	130		

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RECEIVED SEPTEMBER 16, 1933 PUBLISHED OCTOBER 6, 1933

THE SOLUBILITY OF SALTS IN H^2H^2O

Sir:

Preliminary experiments in this Laboratory have indicated that the solubility of salts in water containing a high concentration of H^2H^2O is markedly less than in ordinary distilled water at the same temperature. These solubility measurements were conducted in the usual way by preparing a saturated salt solution, removing and weighing a portion of the saturated solution, and finally weighing the residual salt after evaporation and suitable drying. By reason of the small volume of heavy water available, however, these operations were performed on a small scale using a special technique. The validity of the procedure was tested by first determining the solubility of a typical salt in ordinary water, and it was found that such solubility measurements could be made with an error of less than one per cent.

In the case of sodium chloride where 1.000 g. of ordinary water dissolves 0.359 g. at 25°, it was found that 1.000 g. of water containing 92% H^2H^2O dissolves only 0.305 g. of this salt, a difference of −15.0%. On a molar basis this corresponds to 0.111 mole of sodium chloride dissolved by a mole of ordinary water as contrasted to approximately 0.103 mole dissolved by one mole of heavy water, a difference of −7.2%. Similarly with barium chloride where 1.000 g. of ordinary water dissolves 0.357 g. of the anhydrous salt at 20°, it was found that 1.000 g. of water containing 92% H^2H^2O dissolves only 0.289 g. of the dehydrated salt at this temperature, a difference of −19.0%. This corresponds to 0.0309 mole of barium chloride dissolved by a mole of ordinary water in contrast to approximately 0.0275 mole dissolved by one mole of the heavy water, a difference of −11.0%. In the course of the last experiment well crystallized barium chloride hydrated with H^2H^2O was obtained with the view to examination for possible differences in crystal form as compared with the ordinary hydrate.

This decreased solubility of salts in H^2H^2O as contrasted with ordinary water is probably a general effect governed by the fundamental differences between the two liquids. Further investigation should show other interesting differences between the two liquids as solvents.

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RECEIVED SEPTEMBER 19, 1933 PUBLISHED OCTOBER 6, 1933

SOME PROPERTIES OF HEAVY WATER

Sir:

We have measured a few characteristic properties of water containing various proportions of the heavy hydrogen isotope up to 92%, and have used these values for the purpose of extrapolation to 100%. The heavy water used in the experiments described in this communication was prepared by prolonged electrolysis of an alkaline solution with nickel electrodes. In estimating the proportion of H^2 from the density measurements, the value d^4_{20} 1.1056 given by Lewis and Macdonald [THIS JOURNAL, **55**, 3057 (1933)] was used. All our experimental data are given so that even should the figure 1.1056 later prove to be wrong, our results will not be without value. The molar quantities are calculated assuming the molecular weight to be 20.032.

We have also attempted to determine the concentration of oxygen isotope O^{18} by decomposing the heavy water and combining the hydrogen and oxygen with ordinary oxygen and hydrogen, respectively. This was done in the apparatus shown. The heavy water was passed back and forth over hot iron between the traps A and B, liquid air being used to collect the fractions. As the hydrogen was released it was passed over hot copper oxide and the resulting water was caught in trap C (Fraction X). Ordinary dry, oxygen-

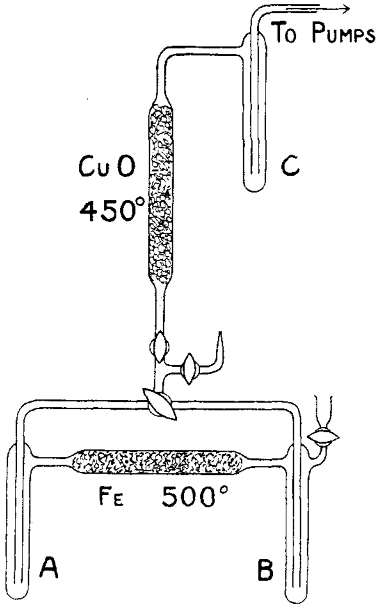

Fig. 1.—Apparatus for analysis of heavy water.