Thermal Diffusion in Dilute Alcoholic Solutions (A Preliminary Report).

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Thermal diffusion of various aqueous solutions by using the thermal diffusion column has been studied by the present author, and it has been found that there exist some regularities in the separation of these solutions[1][2]. On the other hand, researches in alcoholic solutions are also going on in order to clarify the behaviour of the ions in solutions. Some of the experimental results will be reported here preliminarily.

The experimental method and the apparatus used are the same as described in a previous report. The data in the cases of NaCl solution and HCl solution (0.5 normal), containing 8~9 mole% of ethyl alcohol, are described in Table 1 together with the data of the corresponding aqueous solution (1 normal) for the sake of comparison. The separation

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(1)   This Bulletin, **16** (1941), 232, 473; **17** (1942), 42.

(2)   *J. Chem. Soc. Japan*, **62** (1941), 480; **63** (1942), 105.

ratio is the quantity defined as the concentration at the bottom reservoir devided by that at the top reservoir.

Table 1.   Experimental Results.

Experimental Conditions: { Distance of the annular space, 1.5 mm; Higher Temperature, 76°C; Lower Temperature, 20°C.

Solute.	Normality.	Alcohol % in mole.	Separation Ratio of the Solute at		
			1 hr.	2 hrs.	infinite hrs.
HCl	1	0.0	1.20	1.22	1.25
	0.5	8.5	1.11	1.11	—
NaCl	1	0.0	1.04	1.05*	1.05
	0.5	8.8	1.01	1.02	—

* Interpolated value.

It has been shown from the decrease of the separation ratio that the velocity of the thermal diffusion became smaller by two or three times by adding ethyl alcohol to both solutions. In each run, the concentration change of alcohol was also estimated approximately by the refracto-metrical method, and it was found that only a small separation (within 6%) occurred. Such being the case, the diminution thus found is too small to be explained, if we assume that the added alcohol into the aqueous solution plays only the rôle of a diluting agent in the thermal diffusion of electrolytes. The present author considers that the change of the degree of hydration seems to have some connection with the phenomenon.

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