Proceedings of the Iowa Academy of Science

Volume 46 | Annual Issue Article 30

1939

The Transition Temperature of Deuterates

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temperature: ethyl alcohol, n-propyl alcohol, aniline, acetone, benzene, chloroform, carbon tetrachloride, methyl alcohol, n-butyl alcohol, ether, and three aqueous solutions of ethyl alcohol. The pressures used were varied from the lowest pressure which would give a steady stream of bubbles (approx. 0.6 cm. of Hg) up to about 2.3 cm. of Hg. Capillary diameters were from 0.0137 to 0.0341 cm.

The bubble frequency was practically constant (45-50 bubbles / sec.) for the pure liquids studied at all pressures and capillary diameters used. It follows therefore that the size of each bubble (cm^3) is directly proportional to the rate of gas flow (cm^3/sec.) and is independent of the properties of the liquid and the capillary diameter in the range of experimental conditions used. Higher pressures, larger capillary diameters, and lower surface tension give larger bubbles as a result of the increased rate of flow. In the case of 20.2, 70.0, and 40.7 per cent aqueous solutions of ethyl alcohol the bubble frequency was greater than with pure liquids and showed a much greater variation with pressure.

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THE TRANSITION TEMPERATURE OF DEUTERATES

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The transition points of a number of salts,

$Na_2CrO_4.10D_2O$.....$Na_2CrO_4.4D_2O$
$Na_2CrO_4.10D_2O$.....$Na_2CrO_4.6D_2O$
$MnCl_2.4D_2O$.....$MnCl_2.2D_2O$
$Na_2S_2O_3.5D_2O$.....$Na_2S_2O_3$
$Na_2SeO_4.10D_2O$.....Na_2SeO_4

have been determined. The thermometric method for determining transition temperatures was used. An apparatus was used which required only a few ml. of the deuterium oxide yet accurate to within $\pm$ .002°C.

After comparing the transition points of deuterates with those of the corresponding hydrates, isomorphous crystals seemed to be similarly affected.

The fact that certain deuterates show a higher transition tem-

perature and others a lower transition temperature than that of corresponding hydrates, suggests tentative conclusions as to the relative degree of hydration on the cations and anions.

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ETHYL ETHERATES OF ZINC BROMIDE

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The solvation of solid zinc bromide in contact with diethyl ether solutions has been studied by vapor pressure measurements and solubility determinations from −10 to 35°C. The existence of two solvates, believed to be the dietherate of zinc bromide, $ZnBr_2 \cdot 2(C_2H_5)_2O$ and the monoetherate of zinc bromide, $ZnBr_2 \cdot (C_2H_5)_2O$, was indicated by the following results: Definite changes in slope occurred in the curves obtained by plotting the logarithm of the vapor pressure of ether for systems of varying mol ratios (mols $(C_2H_5)_2O$/mols $ZnBr_2$) against the reciprocal of the absolute temperature and by plotting the logarithm of the solubility of zinc bromide in ether against the reciprocal of the absolute temperature. These changes in slope, which are caused by changes in the solid phases, appear between 0 and 5° and between 15 and 25°C. Further, analyses of the wet solids in contact with the saturated solutions at 0, 15 and 25°C. indicate that the stable solid phases in equilibrium with the saturated solutions at these temperatures are the dietherate, the monoetherate and the unsolvated zinc bromide, respectively.

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BINARY SYSTEMS WITH ACETAMIDE (1) ACETAMIDE — WATER (2) ACETAMIDE — NAPHTHALENE

BEN H. PETERSON

The binary system acetamide and water, investigated by the solubility method, shows the formation of a hydrate of acetamide