

ON THE CONTENT OF DEUTERIUM IN THE WATER OF CRYSTALLIZATION.

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Received August 28th, 1934. Published October 28th, 1934.

It has been reported by Güntherschulze and Keller⁽¹⁾ that no concentration of deuterium occurs when the volume of a given amount of water is contracted by repeating the process of dissolving and crystallizing Na_2SO_4 in it. We have also examined the same process. Although the result has been negative, it may be worth while to state our method in some details, since it has been found by several investigators that the water crystallized in some native minerals was heavier than normal water.^{(2) (3)}

About 20 liters of tap water was saturated with Na_2SO_4 by dissolving the anhydrous salt in it. The solution was then quickly cooled down by dipping the containers in ice water. The deca-hydrate which crystallized out, after being separated from the mother liquor (R_1), was heated in a beaker to convert it into anhydrous salt, and the remaining clear solution (C_1) was then filtered. Both C_1 and R_1 , equal in volume, were subjected to the same process as mentioned above. A part of water (C_2) crystallized out from C_1 and the residual water (R_2) from R_1 were subjected to the third process, all the other water being discarded. The same process was repeated eight times until we obtained finally about 100 c.c. of water of crystallization and about an equal amount of residual water. The densities of these two parts of water, after being carefully purified, were compared with that of normal water by a quartz bouyancy balance. Both were found heavier than normal water by 2 parts per million, but no difference in density between themselves was found within one part per million, showing that no concentration occurred in this process. The same process carried out with Na_2CO_3 by Mr. Gotoh in our laboratory brought about the same result.

We may draw a conclusion that no isotopic fractionation occurs by the crystallization of water with such salts as above at least at low concentrations of deuterium and that the concentration of deuterium which were found in some of the native minerals might be due to the crystallizing out

(1) A. Güntherschulze and F. Keller, *Z. Elektrochem.*, **40** (1934), 182.

(2) E. W. Washburn and E. R. Smith, *Bur. Standards J. Research*, **12** (1934), 305.

(3) Peters, *Z. Elektrochem.*, **40** (1934), 474.

of the water that had been already concentrated in some way, presumably by a slow evaporation in a closed basin, as already pointed out by Washburn and Smith.⁽²⁾

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