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RESEARCH ON HEAVY HYDROGEN AT PRINCETON[1]

By Dr. HUGH S. TAYLOR

DAVID B. JONES PROFESSOR OF CHEMISTRY, PRINCETON UNIVERSITY

THE heavy water produced in the Frick Chemical Laboratory at Princeton University has been found to possess a specific gravity greater than that recorded hitherto by at least two tenths of one per cent. The value obtained for the specific gravity is 1.1078 at 77 degrees Fahrenheit (25 degrees Centigrade) as compared with the value 1.1056 previously recorded by Professor G. N. Lewis, of California. Many samples of this, the purest heavy water hitherto obtained, have been studied by Dr. P. W. Selwood; in all more than three ounces of heavy water of this gravity has been investigated and further processes of refinement have failed to produce any increased density. The presumption is, therefore, strong that this represents the density of pure deuterium oxide.

This heavy water is the residue from the treatment of upwards of 10 tons of industrial electrolytic liquor, which contains about one part of heavy hydrogen to 2,000 parts of light hydrogen. According to Princeton researches, ordinary rain water contains but one part in 5,000 of the heavy atoms. The Princeton production up to the present time corresponds, therefore, to the treatment of approximately 25 tons of ordinary water, and the present operations consume about two tons of industrial liquor per month, with a daily output of three grams of the 100 per cent. product. The method of preparation used is based upon comparative studies by Professor Eyring and Dr. Topley of the fractionation efficiencies of various electrode surfaces.

The costs of production have been materially lowered so that it is now possible to produce this 100 per cent. heavy water for approximately $5 per gram, in-

[1] Recorded at the Princeton Sigma Xi Symposium on Heavy Water, March 20, 1934, and in a lecture at the Franklin Institute, March 21, 1934, on "Heavy Hydrogen —A New Research Tool."