

the dipole rotation is a limited rotation of the entire molecule or merely of the hydroxyl group.

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### THE ACTION OF BROMINE AND BUTADIENE

*Sir:*

Dr. H. Eyring has presented calculations in a paper given before the Section of Chemistry of the American Association for the Advancement of Science which indicated that addition of bromine to butadiene should be 1-4 rather than 1-2. The high energy of activation also indicated that the reaction should not occur in the gas phase. At the request of Doctors Taylor and Eyring, experiments have been made which show that on mixing gaseous butadiene and bromine in the ratio of 1-1 or 1-0.5 with from 15-20 volumes of nitrogen a reaction occurs and that crystals of the 1,4-dibromo-2-butene are formed. The melting point of the unpurified crystals was 53° (very sharp), which is identical with that reported in the literature. A mixture of the product with 1,2,3,4-tetrabromobutane melted from 30 to 48°. On carrying out the reaction in the same bulb which had been previously coated with paraffin, the rate of the reaction was very markedly reduced. This fact together with the observation that no fog or smoke formed in the uncoated reaction sphere leads to the conclusion that the reaction occurs on the surface. The kinetics of the reaction on glass and surfaces are being studied and details of the experiments will be reported later.

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### THE ISOTOPE OF HYDROGEN

*Sir:*

With the aid of Dr. R. T. Macdonald I have been attempting to isolate various isotopes. Less than a month ago we turned our attention to the isotope of hydrogen. Our first experiments, employing a difference in overvoltage suggested by the work of Washburn and Urey, were so promising that we at once planned a systematic series of concentrations which has just been completed. This yielded water of specific gravity 1.035, which means that the heavy isotope constitutes one-third of all the water