

U_3O_8 and ZrO_2 , is fused with six to seven grams sodium bisulphate and the melt dissolved in cold water. The solution is mixed with fifty cc. hydrogen peroxide and poured into a casserole containing five grams pure sodium hydroxide dissolved in fifty cc. water and fifty cc. hydrogen peroxide. No precipitate forms at first, but after heating on the water-bath for a half hour the zirconium oxide settles to the bottom of the dish as a very heavy precipitate which is filtered and washed with hot water. The precipitate is easily dissolved by a warm mixture of hydrochloric acid and hydrogen peroxide. This solution is boiled, precipitated with ammonia, washed at first with ammonium nitrate solution, then with water, ignited, and weighed as ZrO_2 .

Zirconium dioxide taken.	Zirconium dioxide found.	Difference.
0.2150	0.2158	+0.0008

In conclusion the author wishes to state that this work was suggested to him by Prof. Dr. P. Jannasch, of Heidelberg, over a year ago, and much of the work was done in his laboratory, but as the results then obtained were not entirely satisfactory, it was not published at that time.

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APRIL 4, 1898.

ON THE DECOMPOSITION OF CONCENTRATED SULPHURIC ACID BY MERCURY AT ORDINARY TEMPERATURES.

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Received April 9, 1898.

IN a recent number of this Journal,¹ Mr. J. R. Pitman denied the statement of the authors that concentrated sulphuric acid is decomposed by mercury at the ordinary atmospheric temperature, 20° C. Mr. Pitman leaves himself open to the same criticism that could with justice be urged against us; namely, a failure to report the *strength* of the acid obtained in any other way than that by specific gravity.

As is well known, sulphuric acid (sp. gr. 1.84) may contain either 95.6 or 99.2 per cent. H_2SO_4 .² The apparatus which we made use of did not permit a determination of the specific gravity more accurately than the second decimal place. Sulphuric acid (sp. gr. 1.839) contains 99.70 per cent. H_2SO_4 . The acid used

¹ Vol. 20, 100.

² Lunge und Isler: Biedermann's Chemiker-Kalender, 1898, p. 186.

by us in the experiments reported (*vid supra*) contained 99.65 per cent. H_2SO_4 by analysis. Acid of that strength placed in an air-tight glass-stoppered bottle with pure mercury gave off, in twenty-four hours, sufficient sulphur dioxide to bleach a very dilute potassium permanganate solution. In several instances after allowing a longer exposure the gas was easily recognized by its odor when the stopper was removed.

Whether or no any reaction occurs depends entirely upon the *strength* of the acid used, as independently noted later by M. Berthelot, who states that "boiled sulphuric acid has a slow action on mercury forming sulphate and giving off sulphurous acid." He also states that the reaction occurs only at the maximum concentration.¹ When our paper was read before the society in Detroit, Dr. E. W. Morley, in the discussion following, stated that he had previously made similar observations but had not published them. In a recent letter from him he stated that when freshly distilled cold sulphuric acid was in contact with mercury, he found it impossible to maintain a vacuum on account of the evolution of from one to two cc. sulphur dioxide per day.

An ordinary hydrometer may indicate acid of 1.84 sp. gr., when in fact it may be of 1.837 sp. gr. or 94.2 per cent. acid, which fact we have observed. We have lately (since the appearance of Mr. Pitman's paper) observed that ninety-five per cent. acid does not seem within a reasonable length of time to react in the cold with mercury. Further we have noticed that during three weeks in this climate ninety-five per cent. acid dropped to 94.2 per cent. by allowing the bottle to remain open a few minutes each day. The content of acid more or less exposed to the moisture of the air while being used in a nitrometer could easily change, the stronger the acid the more rapid the change. Acid of ninety-four per cent. serves very well for desiccation in ordinary gas analysis and has no apparent action upon the mercury; however, the authors insist that concentrated sulphuric acid of 99.5 per cent. strength is decomposed by mercury.

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¹ *Chem. News*, 76, 325; *Compt. rend.*, 125, 20.