which the peroxides are destroyed by mild oxidizing agents.

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RECEIVED JULY 25, 1934

OXYGEN ISOTOPE SEPARATION BY CHEMICAL REACTION

Sir:

A recent report by W. R. Smythe [*Phys. Rev.*, **45,** 299 (1934)] gives the $O^{16}:O^{18}$ ratio in oxygen obtained by the thermal decomposition of lead peroxide as 503 ± 10. He suggested that there might be some selectivity in the decomposition of the peroxide, favoring O^{16} and making his ratio too high. Since J. Krustinsons [*Z. Elektrochem.*, **40,** 247 (1934)] has recently shown that the decomposition of lead peroxide involves a series of solid solutions, there was a distinct possibility that isotope separation might in this case occur. Ordinarily, decomposition processes in solids occur only at interfaces between two phases and this limitation of reaction might well mask any selective reactivity of isotopes. We have, therefore, decomposed 450 g. of lead peroxide in a system which had been heated and evacuated at 235°. On raising the temperature to 270°, a sample of oxygen (I) was collected by means of a Sprengel pump. Four other samples were collected over a period of days and a final sample (VI) when the residual solid was practically all yellow in color, after a total decomposition time of sixteen days, the temperature having been raised slowly to 310°. An analysis of the first and last samples by Dr. W. Bleakney, of the Palmer Physics Laboratory, using the mass spectrograph, gave "uncorrected" ratios $O^{16}:O^{18}$ of (I) 468, 470, 472 and (VI) 470, 478, and 468. There is, therefore, no evidence at all of any fractionation of the isotopes. The data are in best agreement with measurements by Manian (Dissertations, Columbia University, 1934), using Bleakney's apparatus, on samples of oxygen from meteorites and potassium chlorate, and for which Manian finally arrived at a corrected abundance ratio of 514 ± 13, the correction (for scattered background) amounting to from 4 to 8%. Smythe's ratio does not differ from those of Manian nor our own.

We have also examined the oxygen released from 100 g. of "Superoxol," a 30% hydrogen peroxide, when treated, at ordinary temperatures, with colloidal platinum prepared by the Bredig method. The first sample (I) was that initially evolved, the last (II) was that remaining in the reaction vessel after completion of reaction and standing overnight. Comparative measurements by Dr. Bleakney under as closely comparable conditions as possible gave for the abundance ratio (uncorrected for scattered background) in these two samples: (I) 462 ± 8; (II) 426 ± 4. There appears, therefore, to be, in this case, a definite isotopic separation of oxygen, the divergence between the two analyses being far greater than anything hitherto found with oxygen analyses in the Bleakney mass spectrograph. The separation indicated is in the direction that would result from a less rapid release of O^{18} from the peroxide. We are extending these investigations to other modes of decomposition of hydrogen peroxide and to other materials yielding oxygen at low temperatures.

We wish to thank Dr. Bleakney for his assistance with the analyses.

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RECEIVED JULY 19, 1934