the reaction bulb and then through a weighing U-tube also cooled to −79.° Total product was determined by weighing; the peroxide was then titrated with 0.05 *N* potassium permanganate; and water was obtained by difference.

Temp., °C.	Approx. heating, sec.	Part press. in off-gas in 0.001 atm. H_2O_2	H_2O	Ratio H_2O_2/H_2O	H_2 reacting, %
550	0.5	0.068	0.37	0.18	0.046
550	1	.21	1.7	.12	.20
540	1	.19	0.76	.25	.10
530	1	.056	0.21	.27	.028

In spite of the extremely small total conversions (less than 0.2% H_2), the best result obtained was one mole of peroxide to four moles of water. The possibility of independent, direct formation of water from the elements is thus by no means excluded.

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RECEIVED JULY 10, 1931
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SURFACE REACTIONS OF ATOMS AND RADICALS

Sir:

Recently we[1] have found that water vapor, dissociated in a discharge tube, will oxidize carbon monoxide to carbon dioxide. Since atomic oxygen is not very effective in causing this oxidation we are led to believe that the carbon dioxide is formed as the result of a reaction involving the hydroxyl radical. Assuming that this is the case, we can use the oxidation of carbon monoxide as a test for OH and in this way determine whether it is affected by certain catalytic surfaces.

By observing the effect of different catalysts on the yield of carbon dioxide, we have found that a dehydrogenation catalyst is inefficient in causing the H + OH combination while a dehydration catalyst is quite efficient. This result is in accord with the work of Taylor and Lavin[2] and shows, as might be expected, that a strictly dehydrogenation catalyst is only effective in causing the recombination of hydrogen atoms.

In light of the fact that we are able to observe the oxidation of carbon monoxide after practically all of the hydrogen atoms have been removed (by the dehydrogenation catalyst) it seems that we have here a method for the separation of H and OH.

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[1] Lavin and Jackson, THIS JOURNAL, **53**, 383 (1931).
[2] Taylor and Lavin, *ibid.*, **52**, 1910 (1930).