AN EQUATION RELATING VISCOSITY AND SURFACE TENSION

Sir:

An equation relating viscosity and surface tension can be obtained by combining the following equations of Batchinski [*Z. physik. Chem.*, **84,** 643 (1913)] and McLeod [*Trans. Faraday Soc.*, **19,** 38 (1923)], respectively,

$$\eta = \frac{C'}{v - w} \qquad \frac{\gamma}{(D - d)^4} = C$$

where η is the viscosity, v the specific volume, w the limiting volume or approximately van der Waals b, γ the surface tension, D the density of the liquid, d the density of the vapor, and C' and C are constants for a given liquid. Below the boiling point the density of the vapor may be neglected in comparison with the density of the liquid. Neglecting d and equating v to $1/D$, we obtain

$$\gamma^{-1/4} = A\frac{1}{\eta} + B$$

where A and B are constants characteristic of the liquid.

If this equation is correct, a straight line will be obtained when $\gamma^{-1/4}$ is plotted against fluidity. When such plots were made for twenty-five liquids, water included, the deviations of the points from a straight line were within the experimental error except in the cases of ethyl ether and the alcohols, in which the surface tension at low fluidities was less than the straight-line requirements, the deviation increasing as fluidity decreases.

LABORATORY OF PHYSICAL CHEMISTRY
UNIVERSITY OF WISCONSIN
MADISON, WISCONSIN

DANIEL SILVERMAN
W. E. ROSEVEARE

RECEIVED SEPTEMBER 26, 1932
PUBLISHED NOVEMBER 5, 1932

THE PHOTOCHEMICAL FORMATION OF HYDROGEN PEROXIDE

Sir:

In previous communications [*J. Phys. Chem.*, **30,** 34 (1926); THIS JOURNAL, **49,** 2763 (1927)] the author has reported the quantum yield for the formation of hydrogen peroxide from hydrogen and oxygen by light of wave length 2536 Å. when photosensitized by mercury vapor. In making these measurements, a quartz filter containing chlorine and bromine was used. The manufacturers gave the transmission of this filter for 2536 Å. as 80%. Since these papers were published Frankenburger and Klinkhardt [*Z. physik. Chem.*, **B15,** 421 (1932)] have also reported work on this reaction in which they obtain a yield of 1.2 molecules of H_2O_2 and 1.5–2.5 molecules of H_2O per quantum absorbed. The author originally reported 6.6 molecules of H_2O_2 formed per quantum absorbed. In attempting to account for this discrepancy the filter originally used was borrowed from Princeton University and its transmission measured by Mr. Frank Benford,