several days or weeks atmospheric storage, but these are inconsequential under hypersonic flow conditions, where $\gamma \geq 10^{-2}$ provides a "good effective catalyst." Accordingly, we have experienced no difficulty with the catalytic gage.

We conclude from this study that, for measurements involving noncatalytic surfaces, it is essential that the surfaces be conditioned (exposed to oxygen atoms) within hours of their use, preferably in place immediately before the measurement. This was found to be necessary in earlier work[1,3] in order to achieve reproducible results on good catalysts in slow flows. It remained for the present tests to demonstrate that, for measurements in a diffusion-controlled regime, the variations in the noncatalyst are of overriding importance, and that they can completely invalidate atom recombination heat-transfer measurements. The surface kinetic processes responsible for the large changes in efficiency of SiO[‡] and silicone oil are not understood. They would appear to involve the slow chemical formation of a very thin catalytic layer, which is easily removed by the action of the highly reactive O atom stream.

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Comment on "Transport Properties of Hydrogen"

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In a recent paper, Brezing[1] gives values of the transport properties of hydrogen over a wide range of temperatures and pressures. His values at a pressure of 100 atm and temperatures ranging from 20,000° to 100,000°K have been compared with values calculated previously by us for the same conditions.[2,3] Although the methods used were similar, the two sets of calculations appear, as shown in Fig. 1, to differ significantly in magnitude, although they exhibit the same trends. Any differences due to composition, etc., should vanish at high temperatures where the mixture is essentially all H^+ and e. Under these conditions, the values given by Brezing are seen to be smaller by a factor of 4. This factor can be explained by a difference in the expression used for the average value of the relative kinetic energy of two ions, which appears in the expression for viscosity for both shielded-Coulomb[4] and Coulomb-plus-cutoff potentials.[5] Chapman and Cowling (Ref. 6, p. 93) and Hirschfelder et al. (Ref. 5, p. 549) point out that the proper form for this expression is $\bar{E} = 2kT$, whereas Liboff,[4] in his derivation of the viscosity expression for the shielded-Coulomb potential, incorrectly uses the value kT. Use of this same value by Brezing would account for the factor of 4 discrepancy.

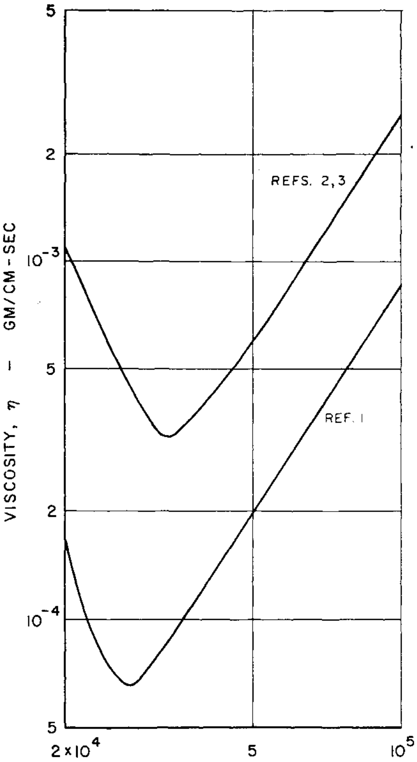

Fig. 1 Viscosity of hydrogen.

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