

mirror. Thus by means of the deflection of a light beam, small forces on the collector could be measured. The forces were determined as a function of the negative potential applied to the collector using several different values of the total current through the arc.

From the data obtained the calculation of an accommodation coefficient for helium positive ions is quite simple if corrections for the current that reaches the collector at its edges are neglected. Let β be the fraction of the incident energy of the ion which is retained after neutralization. β is approximately equal to $1 - \alpha$ where α is the accommodation coefficient. Assuming that the neutralized ions escape in random directions, the pressure on the collector is given by

$$P = \frac{i}{2e} (2meV\beta)^{1/2}$$

where P is the pressure exerted on the collector, i the positive ion current density, e the

charge, m the mass of a helium ion and V the negative potential of the collector with respect to the surrounding space. Putting in the constants,

$$\beta = \frac{4.63(10^3)P^2}{i^2V}$$

where P is in milligrams per square centimeter, i in milliamperes per square centimeter and V in volts. α follows immediately from the relation $\beta = 1 - \alpha$.

When a small correction for edge effects is included preliminary results indicate a value of about 0.5 for α . In further work the elimination of edge effects will be attempted and the experiments continued using a number of other gases.

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Raman Spectra of Silico-Chloroform

We have been investigating the Raman spectra of silico-chloroform and have succeeded in observing a number of its Raman frequencies and particularly that characteristic of the Si-H-bond. The spectra were observed by illuminating with a mercury arc a tube filled with the liquid immersed in liquid ammonia contained in an unsilvered Dewar flask. The light was reflected from the top of the tube into a Hilger D78 glass spectrograph.

The frequencies which we have observed together with those of chloroform (Proc. Roy. Soc. **A127**, 360 (1930)) are shown in the following table:

CHCl ₃	SiHCl ₃
261 (5)	179 (strong)
367 (6)	250 (strong)
669 (6)	489 (very strong)
762 (3d)	587 (strong diffuse)
1218 (2d)	799 (strong diffuse)
1441 (1)	—
3019 (3d)	2258 (strong diffuse)

It is to be noted that we observe six frequencies which can be correlated with those of chloroform, the frequencies of silico-chloroform being always smaller than those of the other compound. We have been unable to de-

tect the seventh frequency which should be the weakest of the frequency displacements. The highest frequency which we observe, namely, 2258, is that which corresponds to the frequency usually assigned to the vibration of the proton along its valency bond with respect to the carbon atom in chloroform; so that it is to be interpreted as a similar vibration of the hydrogen atom with respect to the silicon atom along the Si-H-bond.

The differences in these two frequencies can be due only to the difference in the restoring force constants for the two cases, for the effective mass in both cases should be approximately the mass of the hydrogen atom. We have also been able to observe both positive and negative displacements for the lower frequencies from the yellow lines of mercury in addition to those more easily observed from the blue and violet lines. Complete details of this investigation and that of other compounds of this type will be reported at a later date.

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