TABLE II. *Comparison of Raman frequencies in gases and liquids.*

LIQUID		GAS	
Obs.	Calc.	Obs.	Calc.
Methylacetylene			
929.5	(929.5)	930	(930)
2123.5	2178	2142	2179
2926.2	(2926.2)	2941	2939
Dimethylacetylene			
2920	2926	2938	2938

neighborhood of 2100 cm^{-1} there were observed two faint companions. We first believed they were due to rotation effects but calculations showed that the separations corresponded to no reasonable moment of inertia. The results are given in Table I.

In Table II there appears a comparison of the gas frequencies with those for the liquids.[2] As is generally the case, the gas frequencies are higher than those of the liquids. We have carried out the normal coordinate treatment for the vibrations which are symmetric with respect to the threefold axes of these molecules. Certain of the force constants involved were taken from data on methane and acetylene. Details of the calculations which were extended over a series of compounds will appear later. The calculated values in Table II comprise a portion of our calculated results. The agreement is fairly good although the results indicate that the C≡C force constant is greater in acetylene itself than in the substituted compounds.

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February 15, 1937.

[1] George Glockler and F. T. Wall, J. Phys. Chem. **41**, 143 (1937).
[2] George Glockler and H. M. Davis, J. Chem. Phys. **2**, 881 (1934).

The Reemission of Visible Light and the Coloration by Ultraviolet Light of Certain Crystals

A new electronic effect in crystals of the type exemplified by magnesium oxide has been observed by the writer. When some large crystals of magnesium oxide are irradiated by ultraviolet light, in particular the 2536A mercury line, they become tinted a deep purple. On removal from the source of radiation a spontaneous decolorization process begins immediately. This process is initially very rapid, but the rate decreases as a function of time. This is shown in Fig. 1. There is a simultaneous emission of light throughout not only the whole visible spectrum but extending to the near infrared. The original magnesium oxide crystals show little absorption, if any, in the ultraviolet.

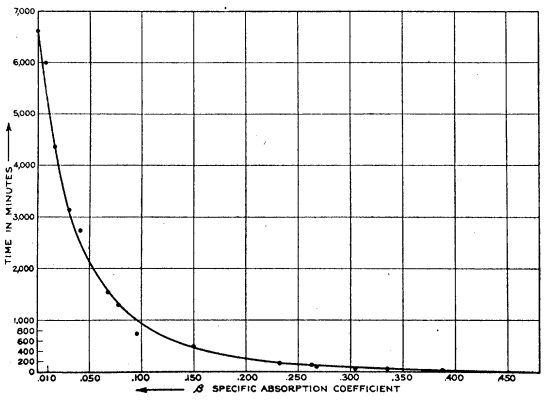

FIG. 1. The decrease in absorption of artificially colored magnesium oxide as a function of time.

It is presumed that this effect owes its origin to a type of electron migration and the reemission is attributed to a recombination. It is similar to the already noted behavior of the alkali halides. Since all crystals of magnesium oxide do not behave in an identical fashion the absorption and reemission may be the result of the accumulation of traces of impurities in specific portions of the magnesium oxide lattice.

It is of interest to note that the rate of reemission of energy as determined by the rate of decolorization is markedly increased by elevating the temperature. At 25°C complete decolorization takes several weeks but is accomplished in three minutes at 1000°C. Furthermore, irradiation of the colored material with the 4358A mercury line will cause decolorization in not more than thirty minutes. Because of the antagonistic effects of the 2536 and 4358A mercury lines, the high pressure silica mercury lamps are not suitable as a source of incident energy to bring about coloration. On the other hand the low pressure discharge type will produce admirable results. A further study of this effect is being made.

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