

The Raman Spectrum of Lead Tetramethyl

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TABLE I.

| Filament temperature (°K) | Iodine pressure $\times 10^{-3}$ mm | Currents in arbitrary units | | Electron affinity (kcal.) |
|------------------------------|--|-----------------------------|----------|------------------------------|
| | | Ion | Electron | |
| 1813 | 0.35 | 2.3 | 213 | 76.7 |
| 1886 | 0.92 | 14.4 | 930 | 76.1 |
| 1887 | 1.8 | 20.5 | 2450 | 71.6 |
| 1891 | 0.28 | 9.5 | 1320 | 78.3 |
| 1892 | 1.5 | 19.3 | 2430 | 72.4 |
| 1968 | 1.4 | 116. | 15300 | 75.5 |
| 2031 | 1.8 | 560. | 53000 | 78.6 |

currents can also be used as auxiliary measurement of the ion current.

A few preliminary measurements are reported in Table I. The results,* although capable of much greater refinement

indicate values in good agreement with other methods,² 74.2 kcal. being calculated from the theoretical lattice energies of the alkali iodides.

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February 9, 1934.

² J. E. Mayer and L. Helmholz, *Zeits. f. Physik* **75**, 19 (1932). J. E. Mayer, *Zeits. f. Physik* **61**, 798 (1930).

* The calculations assume no reflection of electrons, ions or atoms from the filament. The experimental electron emission of tungsten suggests a possible electron reflection coefficient 0.5; assuming this would decrease our electron affinities by about 2.5 kcal.

The Raman Spectrum of Lead Tetramethyl

We have been investigating the Raman spectra of a group of metallo-organic compounds. In this letter we will give some results we have obtained with lead tetramethyl.

The lead tetramethyl was distilled *in vacuo* into the Raman tube. The spectra were excited by the blue and violet mercury lines separately by using an apparatus described by one of us with D. H. Andrews.¹ The following lines were found: 135 (8br), 458(10), 472(8), 766(1/2), 930(0), 1155(3), 1169(2), 2921(8), 3000(3). The 2921 and 3000 lines are assigned to vibrations in which the C—H bond is stretched. The 930 line is probably an harmonic of 458. The remaining lines may be assigned to the bending and stretching motions of a pentatomic molecule whose structure is probably tetrahedral. The three lowest are probably due to bending and the others to stretching.

It is of interest to note that there are two pairs of close doublets of considerable intensity, and that the line at

135 cm^{-1} is broad and unsymmetrical, which suggests that it is also a doublet. The assignment of frequencies to types of vibrations is thus rather uncertain. The low intensity of 766 renders its association with the symmetrical motion improbable, but it is difficult to reconcile the doublet structure of the other frequencies with this kind of motion. The apparent absence of the line at 1450, which usually occurs in compounds containing the methyl group, is also of interest.

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¹ D. H. Andrews, *J. Chem. Phys.* **1**, 406 (1933).