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REVISION OF THE FUNDAMENTAL CONSTANTS

BERKELEY, CALIFORNIA

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ABSTRACT

A revised list of fundamental constants is tabulated.

In 1952 the Subcommittee on Fundamental Constants of the Committee on Physical Chemistry of the National Research Council¹ proposed a list of values of the fundamental constants. However, in view of the changes in R, the gas constant, and k, Boltzmann's constant, due to change in definition of the temperature scale which makes $0^{\circ}\text{C} = 273.150^{\circ}\text{K}$, it seems advisable to reexamine all the constants in light of the recent evaluations of the available data by J. A. Bearden and J. S. Thomsen² and by E. R. Cohen, J. W. M. DuMond, T. W. Layton, and J. S. Rollett.³ The two evaluations agree very closely.

To convert their results to the chemical scale of atomic weights, the conversion factor r from the chemical to physical scale was taken as 1.000275 which E. Wichers⁴ suggests will be accepted as a defined relationship. The following values are consistent with the previously defined relationships, the previously accepted value of 22,414.6 cc-atm/mole for PV at 0°C and zero pressure, and an absolute temperature of 273.150°K at 0°C .

$R = 8.3147 \pm 0.0001$	joules/deg mole
82.060	cc-atm/deg mole
1.98726	cal/deg mole
$N = 6.0230 \pm 0.0002 \times 10^{23}$	molecules per mole
$k = 1.38049 \pm 0.00005 \times 10^{-16}$	ergs/deg molecule
$h = 6.6254 \pm 0.0002 \times 10^{-27}$	ergs sec/molecule
$c = 2.997928 \pm 0.000004 \times 10^{10}$	cm/sec
$F = 96,493.5 \pm 2$	coul/eq
23,062.5	cal/volt eq

The uncertainties given are the probable errors (50-50 change of true value being within limits) assigned by Bearden and Thomsen.² This tabulation is being circulated for informal comment since we wish to make certain current work consistent with the best available constants.

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