

PRESENT STATUS OF THE VALUES OF THE FUNDAMENTAL CONSTANTS FOR PHYSICAL CHEMISTRY

FREDERICK D. ROSSINI

*Chemical and Petroleum Research Laboratory, Carnegie Institute
of Technology, Pittsburgh 13, Pennsylvania, U.S.A.*

SUMMARY

The present status of the values of the fundamental constants for physical chemistry was presented. Since the report issued by the National Research Council Sub-committee on Fundamental Constants in 1951, the following changes have occurred: the value for the absolute temperature of the ice point (or for the triple point) of water has become a defined constant by action of the appropriate international group; improved values for the Faraday, Avogadro number, electronic charge, velocity of light, and Planck's constant have become available through some new experimental data and analysis of all the data by Dumond and Cohen. In addition, it appears that final international action may be concluded in 1961 leading to a new scale of atomic weights, based on carbon-12 equal to 12.0000. This scale, which will be the same for both chemists and physicists, will differ from the present chemist's scale by 42 parts per million and from the present physicist's scale by 317 parts per million. The change in the scale of atomic weights has the effect of further changing the value of the Avogadro number (and, correspondingly, the pressure-volume product for one mole of ideal gas). The simultaneous lowering of the value of the absolute temperature of the ice point (by 37 parts per million) and of the value of the pressure-volume product for one mole of ideal gas (by 42 parts per million) almost cancels their effect on the value of the molar gas constant, which will change only by about 5 parts per million. Appropriate details of the foregoing matters were given.

* Present address: University of Notre Dame, Notre Dame, Indiana, U.S.A.