

C. Prominent Spectral Lines for Fe I to Fe V (Vacuum Ultraviolet to Near Infrared Regions)

These lists were recently prepared under the auspices of the Committee on Line Spectra of the Elements of the National Academy of Sciences—National Research Council as part of a general wavelength table.^{1,2} The tables contain the outstanding spectral lines—from the far ultraviolet to the far infrared—of neutral (I), singly ionized (II), doubly ionized (III), triply ionized (IV), and quadruply ionized (V) iron atoms. The lines are selected from larger lists (see references) in such a way as to include the stronger observed lines in each spectral region.

The data were compiled by Henry M. and Hannah Crosswhite, Argonne National Laboratory (Fe I and Fe II), and Joseph Reader, NBS (Fe III—Fe V). For Fe I and II, the following six literature references were used as the principal sources of data:

- H. M. Crosswhite, *J. Res. Nat. Bur. Stand. (U. S.)* **79A**, 17 (1975).
J. C. Dobbie, *Ann. Sol. Phys. Obs. Cambridge* **5**, 1 (1938).
L. C. Green, *Phys. Rev.* **55**, 1209 (1939).
S. Johansson and U. Litzen, *Phys. Scr.* **10**, 121 (1974).
U. Litzen and J. Verges, *Phys. Scr.* **13**, 240 (1976).
H. N. Russell, C. E. Moore, and D. W. Weeks, *Trans. Am. Philos. Soc.* **34** (Part 2), 111 (1944).

For Fe III, IV and V, the following references were used:

- B. Edlen and P. Swings, *Astrophys. J.* **95**, 532 (1942).
S. Glad, *Ark. Fys.* **10**, 291 (1956).

J. O. Ekberg and B. Edlen, *Phys. Scr.* **18**, 107 (1978).

J. O. Ekberg, *Phys. Scr.* **12**, 42 (1975).

All wavelengths are given in Angstrom units (\AA). Below 2000 \AA , the wavelengths are in vacuum; above 2000 \AA , the wavelengths are in air. Wavelengths given to three decimal places have an uncertainty of less than 0.001 \AA and are therefore suitable for the calibration of most spectrometers. The line intensities are estimates of the relative strengths of lines which are not greatly separated in wavelength. Since the intensity scale is in general different for each data source, even within a fairly narrow wavelength range, the intensities tabulated here are useful only as a rough indication of the appearance of a spectrum. Furthermore, in the tables of first and second spectra the intensities of the lines of the singly ionized atom relative to those of the neutral atom should be used with caution, inasmuch as the concentration of the ions in the light source depends greatly on the excitation conditions.

The descriptive symbols used in the tables have the following meaning:

- H — hazy
L — shaded to longer wavelengths
S — shaded to shorter wavelengths
P — perturbed by a close line
W — wide

References

1. J. Reader, C. H. Corliss, W. I. Wiese, and G. A. Martin, *Wavelengths and Transition Probabilities for Atoms and Atomic Ions*, Nat. Stand. Ref. Data Ser., Nat. Bur. Stand. (U.S.), 68, 415 pgs., U. S. Government Printing Office, Washington, D.C. (1980).
2. J. Reader and C. H. Corliss, in *Handbook of Chemistry and Physics*, 64th Edition (R. C. Weast, Ed.), pp. E192—E318, CRC Press, Inc., Boca Raton, FL (1983).