Criticisms leveled in past years (crude technique, absence of statistical evaluation, irrelevant references to Pavlov and to the state) seem largely inapplicable to this collection. If one wants a pleasant introduction into modern Soviet neuroscience, and the names of some investigators that are worth the trouble to follow, this work will supply both. The book is attractively printed and the illustrations are of good quality. The translation is competently done, so far as I can tell. I must also express my appreciation to Livanov for having provided the occasion for this publication.

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Molecular Electronic Spectra

Low Temperature Spectroscopy. Optical Properties of Molecules in Matrices, Mixed Crystals, and Frozen Solutions. BEAT MEYER. Elsevier, New York, 1971. xii, 654 pp., illus. $33.50.

It possibly would have been a mistake for Meyer in his *Low Temperature Spectroscopy* to be too meticulous about historical priorities in this field. In the first place, almost every physical chemist, photochemist, or solid state physicist has found himself doing a low temperature spectroscopic experiment at some time or other. In the second place, the numerous streams of low temperature research in optical spectroscopy have frequently isolated themselves from one another, not by virtue of any serious differences in cryogenic technology but simply because some workers have been interested in atoms, others in large molecules, others in *d*- and *f*- electrons, others in free radicals and unstable molecules, others in molecular crystals, and still others in semiconductors, and so on. It would therefore be a monumental operation to present a detailed account of the history of low temperature spectroscopy. Although Meyer has made a modest attempt at providing this background, only the part on matrix isolation spectroscopy of small molecules seems adequately researched.

Most of the book is concerned with just a narrow part of low temperature spectroscopy, and Meyer's term "cryochemistry" might have been a more appropriate title for a book that deals with mainly molecular electronic spectra and avoids the temptations to explain much of the physical meaning either of the spectra or of their modifications due to the states of the various matrices in which the molecules are studied. These matrices are organic glasses, vapor-deposited matrices of small molecules or atoms, and mixed crystals. Inert matrices are the author's specialty, and the book is best in the parts dealing with them. Meyer is also at his best in the purely experimental chapters, when he is giving us advice about buying equipment, finding the proper gaskets for cold windows, or how to avoid explosions of liquid helium dewars and numerous other useful hints for the effective running of a cryogenic laboratory. An additional practical feature is the set of useful tables of physical properties for common matrix materials, including glasses and plastics. The only ground rules are that the sample not consist of a neat ionic or molecular solid and that the temperature be less than 100°K.

Although the book contains 654 pages one finds that some 280 of these are occupied by a tabulation of spectral data on atoms, diatomics, and triatomics mostly in inert matrices, and organic molecules in glasses, mixed crystals, and crystals and by some 2200 references to low temperature spectroscopic work on molecules and free radicals. The data on atoms through triatomics are presented in a form similar to that used in Herzberg's compilations (*Electronic Spectra of Polyatomic Molecules,* Van Nostrand, 1966) of gas phase molecular spectra: The energy of the 0,0-band, the vibrational frequencies, and the nature of the electronic state are presented, but intensity data are excluded. Meyer has used a similar but less detailed method in tabulating information on polyatomics ("poly" means greater than or equal to four, according to Meyer, but does not include organic molecules) and organic molecules. Since there are so few definite assignments for electronic and vibrational states of larger molecules the average worker might have wanted to use tables of this sort for no other reason than to find the wavelengths of light that a molecule absorbs and emits, the intensity of these processes, and who has previously worked on low temperature spectra of that molecule. For most molecules Meyer has given only a single wave number [as $(E/hc) \times 10^{-4}$ μm^{-1}], corresponding to the energy of a feature of just one of the electronic states of the molecule. Frequently these numbers are 0,0 band energies, although this is never stated, and for many of the molecules in the tables even such an identification would be questionable.

It would have been especially useful to have more information on such things as the approximate width of spectra at various temperatures, the extent to which vibrational structure is developed in different matrices, and absorption intensity. The tables do include emission lifetimes, so one can guess whether the emitting state has the same spin as the final state of the emission process. In any event, the references are also cited in the tables, and although the reader doesn't know which reference, for a particular molecule, refers to which entry under solvent, temperature, absorption, emission, or lifetime, he is gratified to find that the alphabetically ordered bibliography includes the names of coauthors and the full titles of the papers. Apart from a few data concerning rare gas matrices, Meyer's tables are not an improvement over the Landolt-Börnstein compilations on the luminescence spectra of organic substances (*Numerical Data and Functional Relationships in Science and Technology*, new series, group 2, vol. 3, Springer-Verlag, 1967).

This book does not provide answers for those who want to know the extent to which low temperature spectroscopy has contributed or will contribute to our understanding of molecular structure. It does provide a needed single source of low temperature technical expertise, especially in regard to matrix isolation techniques. Perhaps the slant of the book, and one view of the state of the art, is best conveyed by noting that the number of waves per micrometer is tabulated to four significant figures for diatomics and to only three for polyatomics.

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Chemical Structure

Absolute Configuration of Metal Complexes. CLIFFORD J. HAWKINS. Wiley-Interscience, New York, 1971. xii, 350 pp., illus. $19.50. Interscience Monographs on Chemistry, Inorganic Chemistry Section.

The title notwithstanding, only about a third of this book deals directly with absolute configurations. Most of it is devoted to the related subject of