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ANNOTATED BIBLIOGRAPHY OF SPECTROPHOTOMETRIC STUDIES IN THE SYSTEM U-Fe-Se-S-O-H, 1967-78

by

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This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature.

INTRODUCTION

Preparation of this bibliography was originally begun to supply background information on previous ultraviolet and visible spectrophotometric studies on various chemical species thought to be important in the formation of sedimentary uranium deposits; we also thought that preparing the bibliography would help direct experimental efforts to determine the association of iron and uranium with several metastable sulfur species. In compiling these references, however, we found that much work had been done on the chemical species of interest by using types of spectroscopy other than ultraviolet and visible spectrophotometry. The dimensions of the bibliography were therefore broadened to include a wide variety of spectral-measuring techniques to make this report useful to a larger audience.

SCOPE OF BIBLIOGRAPHY

This compilation covers the period 1967 through 1978 and is as complete as a reasonable search of the literature would permit. No effort has been made to standardize the units of measurement cited in the annotations, nor has a judgement been made as to the quality of the data.

References listed in this bibliography are limited to spectroscopic studies of chemical species in the U-Fe-Se-S-O-H system. With few exceptions, studies using x-ray or Auger spectroscopy are excluded, and some analytical articles are included. References presenting electronic spectra, which can encompass visible, ultraviolet, or vacuum ultraviolet absorption spectroscopy, are generally included. In the following paragraphs, brief descriptions of the major spectroscopic methods covered by this bibliography are presented.

Ultraviolet and visible spectroscopy is a product of the optical absorbancy of a solution. The intensities of the absorption bands of a solution are used as measures of the concentrations of the various absorbing species present and can be used to obtain information about equilibria in solution. The UV/VIS region of the spectrum ranges from about 200 to 800 nanometers.

Infrared spectroscopy is the absorption of radiation by a molecule that has a changing dipole moment as a result of molecular vibration-rotation. It provides information on bond angles, bond stiffness, and molecular shape.

Moessbauer spectroscopy is the resonance absorption of gamma-ray radiation by a nuclide. Electronic (chemical) differences between the source and sample destroy the resonant condition. Resonance is restored by a relative motion between the source and the absorber (Doppler Shift). The spectrum is the intensity of the gamma-ray signal as a function of this velocity and depends on the molecular structure and oxidation state of the molecule.

Nuclear magnetic resonance spectroscopy (NMR) is the measurement of radio frequencies at which energy is absorbed by a nucleus in an applied magnetic field. The spectra provide information on the location and environment of specific nuclei in a molecule.

Photoelectron spectroscopy is the measurement of the kinetic energy of photoelectrons ejected from a sample by a monochromatic photon source having energies in the x-ray region of the spectrum. From this type of spectra, one can determine ionization potentials and the nature of inner electron orbitals.

Raman spectroscopy results from the interaction of scattered light and a molecule having a changing polarizability because of molecular vibrational-rotational motions. It provides information on bond angles, bond stiffness, and molecular shape.

Microwave spectroscopy results from absorption of microwave radiation inducing changes in rotational energy levels of a gaseous molecule. It provides information on moments of inertia and bond lengths within a molecule.

Electron spin resonance (ESR) or electron paramagnetic resonance (EPR) is the measurement of microwave radiation absorbed by unpaired electrons in an external magnetic field. The spectra provide information on the electronic structure of the molecule.

BIBLIOGRAPHY

Abdullaev, G.B., Mekhtieva, S.I., Abdinov, D. Sh., and Aliev, G.M., 1969, [Optical properties of amorphous selemium]: Spektroskopiya Tverdogo Tela, p. 103-106. In Russian.

Experimental study of the ir transmission spectrum of pure amorphous selenium in the region 0.75-25 u. [Translation unavailable to authors. Data taken from Chem. Abs. 73:135530a, 1970.]

Acharya, P.K., and Narayanan, P.S., 1972, Nature of the hydrogen bond potential well from Raman and infrared spectra of $KH_3(SeO_3)_2$: Indian Journal of Pure and Applied Physics, v. 10, no. 11, p. 827-829.

Experimental study on the Raman spectrum of $KH_3(SeO_3)_2$ at room temperature as well as the infrared spectra of this crystal both at room temperature and at liquid oxygen temperature. Data are given in tables and on a graph.

Adrian, F.J., Cochran, E.L., and Bowers, V.A., 1967, ESR spectrum of HO_2 in argon at 4.2 K: The Journal of Chemical Physics, v. 47, no. 12, p. 5441-5442.

Experimental study of the electron spin resonance spectrum of HO_2 in argon at 4.2 K with observations on the magnetic Hamiltonian. Data are presented in a figure and a table.

Ahmed, Fakhruddin, and Barrow, R.F., 1974, Rotational analysis of absorption bands of gaseous SeS: Journal of Physics B., v. 7, no. 16, p. 2256-2263.

Experimental study on the absorption bands of the gaseous SeS molecule using separated selenium isotopes. Rotational bands in the region 3700 to 4300 Å were analyzed. Data are presented in tables and on graphs.

Allen, G.C., and Griffiths, A.J., 1978, Electron spin resonance spectra of mixed oxides containing uranium and alkaline earth metals: Chemical Physics Letters, v. 53, no. 2, p. 309-312.

Experimental study on the electron spin resonance spectra of several uranium compounds. The results are discussed in terms of the presence of the U(V) oxidation state associated with oxygen deficiency. Data are presented in a table and on a diagram.

Amano, Takayoshi, Hirota, Eizi, and Morino, Yonezo, 1967, Microwave spectrum of the SO radical. Equilibrium S-O distance, electric quadrupole coupling constant and magnetic hyperfine structure constants: Journal of the Physical Society of Japan, v. 22, no. 2, p. 399-412.

Experimental study of the microwave spectrum of the SO radical. The molecular constants are obtained for the ground state and for vibrational state of the ^{32}SO radical. The spectra of ^{32}SO and ^{34}SO are also analyzed. Data are presented graphically and in and in tables.

Anderson, A., Binbrek, O.S., and Tang, H.C., 1977, Raman and infrared study of the low temperature phase of solid H_2S and D_2S: Journal of Raman Spectroscopy, v. 6, no. 5, p. 213-220.

Experimental study of the Raman, ir, and far ir spectra of polycrystalline samples of H_2S and D_2S at 80 K and 18 K. Some new low-frequency Raman modes are described and these are discussed in terms of known crystal structure. Data are presented in both tables and graphs.

Anderson, A., and Campbell, M.C.W., 1977, Infrared and Raman spectra of crystalline sulfur dioxide: The Journal of Chemical Physics, v. 67, no. 9, p. 4300-4302.

Experimental study of the infrared and Raman spectra of condensed SO_2 gas at 20 K with comparisons to previous work. Data are presented in a table and typical spectra are shown in a figure.

Anderson, Anthony, and Loh, Y.T., 1969, Low temperature Raman spectrum of rhombic sulfur: Canadian Journal of Chemistry, v. 47, no. 6, p. 879-884.

Experimental study of the Raman spectra of polycrystalline samples of rhombic sulfur at 100 and 300 K, with excitation by the 5145 angstrom line of an argon ion laser. Data are presented graphically and in two tables.

Aring, K., and Sievers, A.J., 1967, Thermal conductivity and far-infrared absorption of UO_2: Journal of Applied Physics, v. 38, no. 3, p. 1496-1497.

Experimental study of the far-infrared transmission of UO_2 in the frequency range of 5-115 cm^{-1} at 3 K. Thermal conductivity of the same UO_2 crystal was also measured. Data are presented graphically.

Ashurst, K.G., and Hancock, R.D., 1977, Characterization of inner- and outer-sphere complexes by thermodynamics and absorption spectra. Part 1. Sulphato-complexes of the

first-row transition elements: Journal of the Chemical Society, Dalton Transactions, v. 18, p. 1701-1707.

Experimental study of the complex species formed between sulfate ions and several first row transition elements (including Fe II and Fe III) at various ionic strengths. Data are presented graphically and in tables.

Barrow, R.F., Burton, W.G., and Callomon, J.H., 1970, Absorption spectrum of gaseous $^{80}Se_2$ in the region 51500-55000 cm^{-1}: Transactions of the Faraday Society, v. 66 (pt. 11), p. 2685-2693.

Experimental study of the rotational structure in the visible and near ultra-violet spectrum of Se_2, using separated isotopes. Data are listed in tabular form.

Beattie, I.R., Cheetham, N., Gilson, T.R., Livingston, K.M.S., and Reynolds, D.T., 1971, Calculated and observed vibrational spectra of a linear chain, bent chain, and sheet polymer (alpha-bisuth pentafluoride, selenium dioxide, and tin tetrafluoride respectively): Journal of the Chemical Society, A. v. 11, p. 1910-1913.

Both the observed and calculated frequencies for the vibrational spectra of selenium dioxide and two fluoride compounds are presented in this paper. Data are given

both graphically and in tabular form.

Beattie, I.R., and Gilson, T.R., 1970, The single-crystal Raman spectra of nearly opaque materials. Iron (III) oxide and chromium (III) oxide: Journal of the Chemical Society A, v. 6, p. 880-986.

Experimental study with laser Raman spectroscopy on the orientation effects of nearly opaque single crystals such as Fe_2O_3. Data are given graphically and in tables.

Bell, J.T., 1969, Continuities in the spectra and structure of the actinyl ions: Journal of Inorganic and Nuclear Chemistry, v. 31, no. 3, p. 703-710.

Experimental study on the band positions of the absorption spectrum of uranyl and other actinyl ions. Data are presented in both tabular and graphical format.

Berezin, I.A., 1967, [Effect of the molecular structure of a probe on the intensity of sulfur spectral lines]: Zhurnal Prikladnoi Spektroskopii, v. 7, no. 5, p. 785-786. In Russian.

Experimental study of the dependence of the S spectral line 5453.9 Å on the molecular composition of iron and copper sulfides and sulfates. [Translation unavailable

to authors. Data taken from Chem. Abs. 68:118249v, 1968.]

Berkowitz, Joseph, Chupka, W.A., Bromels, Edward, and Belford, R.L., 1967, Vibrations and thermodynamic properties of hexasulfur: The Journal of Chemical Physics, v. 47, no. 11, p. 4320-4324.

Experimental study of the infrared and Raman vibrational spectra of Engel's sulfur, S_6. Data are presented in several figures and tables.

Binder, Herbert, 1973, [Application of the x-ray photoelectron spectroscopy to the elucidation of the bonding in iron-sulfur compounds]: Zhurnal Naturforsch, Teil B, v. 28, p. 255-262. In German.

Experimental study on the ionization energies of some iron-sulphur compounds using x-ray photoelectron spectroscopy. [Translation unavailable to authors. Data taken from Chem. Abs. 80:89301w, 1974.]

Blyholder, G.D., and Cagle, G.W., 1971, Infrared spectra of H_2S, CS_2, SO_2, CH_3SH, and C_2H_5SH absorbed on Fe and Ni: Environmental Science and Technology, v. 5, no. 2, p. 158-161.

Experimental study on the infrared spectra of H_2S, SO_2, and other compounds after exposure to evaporated Fe and Ni. Spectra were recorded over the range 4000 to 450 cm^{-1} at 25°C. Data are given in tables and on graphs.

Boal, D., Briggs, G., Huber, H., Ozin, G.A., Robinson, E.A., and Vander Voet, A., 1971, Matrix isolation laser Raman spectroscopy; the Raman spectra and structures of selenium dioxide monomer and dimer: Journal of the Chemical Society D, v. 13, p. 686-688.

Experimental study of the Raman spectra and molecular structure of SeO_2 and $(SeO_2)_2$. Experimental data are given in tables and on a graph.

Bock, J., Yang, C.C., and Su, G.J., 1971, The determination of the optical constants of amorphous thin films of selenium and arsenic triselenide from infrared reflectivity spectra: International Congress of Glass, Scientific and Technical Communications, 9th, 1, p. 475-483.

Experimental study on the far-ir (40 cm^{-1}-650 cm^{-1}) reflectivity spectra of quenched glasses of selenium and arsenic triselenide. Data are presented graphically and in a table.

Boksha, O.N., and Grum-Grzhimailo, S.V., 1967, [Absorption spectra of natural minerals containing iron in various valence and coordination states]: Spektroskopii Kristallov Materially Simp., 2nd (Published in 1970), Edited by Grum-Grzhimailo, S.V., p. 283-290. In Russian.

Discussion of the characteristics of the absorption spectra of Fe in some natural and synthetic minerals. [Translation unavailable to authors. Data taken from Chem. Abs. 74:17488r, 1971.]

Boldyrev, A.I., Egorova, L.N., and Povarennykh, A.S., 1969, [Infrared absorption spectra of sulfides and their analogs]: Konstitutsiia i Svoistra Mineralov, v. 3, p. 5-16. In Russian.

Experimental study on the ir spectra of many simple and complex sulfides, arsenides, and tellurides in the range 100-400 cm^{-1}. [Translation unavailable to authors. Data taken from Chem. Abs. 73:5846x, 1970.]

Brassington, N.J., Edwards, H.G.M., Long, D.A., and Skinner, M., 1978, The pure rotational Raman spectra of SeO_3: Journal of Raman Spectroscopy, v. 7, no. 3, p. 158-160.

Experimental study of the pure rotational Raman spectrum of SeO_3 monomer in the vapor phase at 410 K.

Rotational constants and bond lengths are presented.

Briggs, A.G., 1970, Vibrational frequencies of sulfur dioxide: Journal of Chemical Education, v. 47, no. 5, p. 391-393.

Experimental study on the vibration-rotation spectrum of gaseous sulfur dioxide in order to determine heat capacity and other information. Data are given in the text and in a table.

Brown, D., Whittaker, B., and Edwards, J., 1973, Techniques for recording solid state transmission spectra of radioactive compounds: United Kingdom Atomic Energy Research Establishment, Report AERE-R 7480, 13 p.

Experimental study on methods for recording solid state transmission spectra. Spectra for hydrated uranium sulfate and uranium selenate are presented along with a discussion of factors which influence the quality of the spectra.

Brown, J., and Burns, George, 1969, Effect of temperature on the spectrum of sulfur dioxide: Canadian Journal of Chemistry, v. 47, no. 22, p. 4291-4292.

Experimental study on the ultraviolet spectrum of sulfur dioxide over the temperature range 20 to 1000 degrees C.

Data are presented on a graph and in the text.

Burger, K., Vertes, A., and Papp-Molnar, E., 1968, The nephelauxetic series and the order of the Moessbauer parameters of iron complexes: Academiae Scientiarum Hungaricae, v. 57, no. 2, p. 257-263.

Experimental study of the Moessbauer spectra of stoichiometri FeS and other prepared compounds with a discussion of the connection between the nephelauxetic effect of ligands and the Moessbauer parameters of their Fe complexes. Data are given in tables and spectra are displayed in figures.

Burley, R.A., 1968, An infrared spectrophotometric study of vitreous selenium doped with selenium dioxide: Physica Status Solidi, v. 29, no. 2, p. 551-558.

Experimental study using infrared spectrophotometry on SeO_2 present in vitreous elemental selenium revealing that the structure of the oxygen-bearing impurities may be as important as the total oxygen content in determining the effect of oxygen on the physical and electrical properties of selenium. Spectra are displayed in several figures.

Burley, R.A., 1968, The infrared spectrum and structure of selenium dioxide: Materials Research Bulletin, v. 3, p. 735-744.

Theoretical and experimental study on the infrared spectrum of selenium dioxide dissolved in vitreous elemental selenium. Data are presented graphically and in a table.

Byrne, R.H., and Kester, D.R., 1978, Ultraviolet spectroscopic study of ferric hydroxide complexation: Journal of Solution Chemistry, v. 7, no. 5, p. 373-383.

Experimental study on the ultraviolet absorbance spectra of ferric ions as a function of pH. A stability constant for the formation of $FeOH^{2+}$ is presented. Data are given graphically and in a table.

Carlson, T.A., and McGuire, G.E., 1973, Angular distribution of the photoelectron spectrum of CO_2, COS, CS_2, N_2O, H_2O, and H_2S: Journal of Electron Spectroscopy and Related Phenomena, v. 1, no. 3, p. 209-217.

Experimental study on the photoelectron spectra of H_2O, H_2S, and other triatomic molecules. Data are presented in tables.

Caywood, J.M., and Taynai, J.D., 1969, Optical absorption of selenium in the alpha-monoclinic crystal and some solvents: Journal of Physics and Chemistry of Solids, v. 30, no. 6, p. 1573-1577.

Experimental study on the optical absorption of alpha-monoclinic selenium over the wavelength range 1.15-0.775 u. Transmission measurements were also made on selenium dissolved in various organic solvents. Data are presented graphically.

Cesaro, S.N., Spoliti, Maurizio, Hinchcliffe, A.J., and Ogden, J.S., 1971, Infrared spectrum and thermodynamic functions of matrix isolated SeO_2: The Journal of Chemical Physics, v. 55, no. 12, p. 5834-5835.

Experimental study on the infrared spectrum of SeO_2 in the range 5000-200 cm^{-1}. Thermodynamic data are given in a table as a function of temperature.

Chakrabarti, C.L., 1968, The atomic absorption spectroscopy of selenium: Analytica Chimica Acta, v. 42, no. 3, p. 379-387.

The sensitivity of four selenium lines was determined by atomic absorption spectroscopy on two different instruments. Various types of flames and organic

solvents were used and detection limits were calculated.

Chan, S.H., and Tien, C.L., 1971, Infrared radiation properties of sulfur dioxide: Journal of Heat Transfer, v. 93, no. 2, p. 172-177.

Experimental study on several bands of SO_2 using low-resolution ir absorption measurements at room temperature. Data are presented both in graphical and tabular format.

Chernozubov, Yu.S., and Selivanov, G.K., 1970, [Spectrophotometric study of sulfur-selenium, sulfur-tellurium, and selenium-tellurium systems in the vapor phase]: Zhurnal Fizicheskoi Khimii, v. 44, no. 3, p. 830. In Russian.

Experimental study on the spectra of vapor mixtures of sulfur and selenium in the region 185-700 mu at 400-1000°C. [Translation unavailable to authors. Data taken from Chem. Abs. 73:9044g, 1970.]

Chimboulev, M.T., and Vassilev, H., 1973, Solubility in the system Na_2SeO_3-Na_2CO_3-H_2O at 30°, 60° and 90°C: Doklady Bolgarskoi Akademii Nauk, v. 26, no. 11, p. 1509-1512.

Experimental study to determine the behavior of selenium

during the aqueous extraction of the sinter cake obtained in the course of the oxidative sintering of copper electrolytic anode mud with soda. Data are given in tables and on graphs.

Cohen, Donald, 1970, The preparation and spectrum of uranium (V) ions in aqueous solutions: The Journal of Inorganic and Nuclear Chemistry, v. 32, no. 11, p. 3525-3530.

Experimental study on the absorption spectra of ions resulting from U(V) ions having been prepared in concentrated chloride solutions and in aqueous carbonate solutions. Data are presented graphically.

Cohen, Leonard, and Feldman, Uri, 1970, A line list for an iron-spark spectrum (10-18Å): The Astrophysical Journal, v. 160, no. 2, p. L105-L106.

Experimental study of the iron-spark spectrum. Wavelengths and visually estimated intensities are given in tabular form.

Couchot, P., Mercier, R., and Bernard, J., 1970, [Vibration spectra of the sulfate ion in a series of crystalline compounds of the type $M^{I}M^{III}(SO_4)_2$. Relations with the structure of such compounds]: Bulletin de la Societe Chimique de France, v. 10, p. 3433-3440. In French.

The ir absorption spectra of some sulfate compounds in the 400-1300 cm^{-1} region are given. [Translation unavailable to authors. Data taken from Chem Abs. 74:36469b, 1971.]

Davis, A.R., Adams, W.A., and McGuire, M.J., 1974, High-pressure laser Raman study of the dissociation of aqueous bisulfate ion: The Journal of Chemical Physics, v. 60, no. 5, p. 1751-1753.

Experimental study on the Raman specta of aqueous bisulfate between 900 and 1100 cm^{-1} at pressures up to 1.0 kbar. Data are presented graphically and in a table.

Deglise, Xavier, and Giguere, P.A., 1971, Studies on hydrogen-oxygen systems in the electrical discharge. v. Raman spectra of the trapped products: Canadian Journal of Chemistry, v. 49, n. 13, p. 2242-2247.

Experimental study on the condensed products of electrically dissociated water vapor and related systems using laser Raman spectroscopy at -180°C. Data are presented graphically and in a table.

Delwiche, J., and Natalis, P., 1970, Photoelectron spectrometry of hydrogen sulfide: Chemical Physics Letters, v. 5, no. 9, p. 564-566.

Experimental study on the photoelectron spectrum of H_2S using a retarding-potential electrostatic analyzer. Data are given graphically and on a table in comparison with earlier works.

Delwiche, J., Natalis, P., and Collin, J.E., 1970, High resolution photoelectron spectrometry of H_2S and H_2Se: International Journal of Mass Spectrometry and Ion Physics, v. 5, no. 5-6, p. 443-455.

Experimental study of the He, Ne, and Ar high-resolution photoelectron spectra of H_2S and H_2Se. The vibrational frequencies for the transitions from the neutral ground state to three ionic states were also measured. Data are shown graphically and in two tables.

DeMauduit, Yves, and Weinreich, G.H., 1969, [Raman-spectrometric investigation of the sulfur dioxide-sulfur trioxide binary system]: Revue de Chimie Minerale, v. 6, no. 5, p. 927-932. In French.

Experimental study on laser-excited Raman spectra of mixtures of SO_2 and SO_3 in various proportions. Data are presented graphically. [Translation unavailable to

authors. Data taken from Chem. Abs. 72:84639n, 1970.]

Dobrolyubskaya, T.S., and Anikina, L.I., 1967, [Application of luminescence for identifying the uranium (VI) state in highly diluted solutions]: Zhurnal Prikladnoi Spektroskopii, v. 6, no. 3, p. 361-365. In Russian.

Experimental study of the luminescence spectra of uranyl nitrate, uranyl carbonate, and U (VI) alkaline solutions at the temperature of liquid nitrogen. [Translation unavailable to authors. Data taken from Chem. Abs. 67:102771q, 1967.]

Donovan, R.J., Husain, David, and Stevenson, C.D., 1970, Vacuum ultra-violet spectra of transient molecules and radicals. Part 1. - CS and S_2: Transactions of the Faraday Society, v. 66, no. 1, p. 1-9.

Experimental study on the absorption spectra of CS and S_2 in the vacuum ultra-violet region. A value for the ionization potential of S_2 is given. Data are given in tables.

Donovan, R.J., and Little, D.J., 1971, Vacuum ultraviolet spectrum of the SO radical: Spectroscopy Letters, v. 4, no. 7, p. 213-215.

A reinterpretation of previous work on vacuum ultraviolet spectrum of the sulfinyl radical. Revised data are presented in the text and in a table.

Donovan, R.J., and Little, D.J., 1972, Vacuum ultraviolet spectra of transient molecules and radicals. Part 3.--HSe and HTe: Journal of the Chemical Society, Faraday Transactions. 2 68 pt., v. 10, p. 1812-1818.

Experimental study on the vacuum ultraviolet spectra of HSe and HTe following isothermal flash photolysis. Experimental data are given in tables.

Dubois, Iwan, 1968, [Absorption spectrum of selenium dioxide in the 4500-2000 Å region]: Bulletin de la Societe Royale des Sciences de Liege, v. 37, no. 11-12, p. 562-573. In French.

Experimental study on the absorption spectrum of SeO_2 in the 2000-4000 Å region and vibrational analysis of three observed transitions. Data are reported in tabular format.

Durmaz, S., King, G.H., and Suffolk, R.J., 1972, Calculation of the vibrational envelope and bond angle in the first excited state of H_2S^+ from the photoelectron spectrum

of H_2S: Chemical Physics Letters, v. 13, no. 3, p. 304-306.

Experimental study of the high-resolution photoelectron spectrum of H_2S with calculations of the vibrational structure and bond angle of the first excited state of H_2S^+. Data are presented graphically.

Edwards, T.H., Moncur, N.K., and Snyder, L.E., 1967, Ground-state molecular constants of hydrogen sulfide: The Journal of Chemical Physics. v. 46, no. 6, p. 2139-2142.

Experimental study to determine the ground-state molecular constants of H_2S that satisfy both infrared and microwave data and an estimate of the equilibrium structure for H_2S. Data are presented both graphically and in tables.

Eng, R.S., Petagna, G., and Nill, K.W., 1978, Ultrahigh ($10^{-4}cm^{-1}$) resolution study of the 8.2-um and 11.3-um bands of H_2SO_4: Accurate determination of absorbance and dissociation constants: Applied Optics, v. 17, no. 11, p. 1723-1726.

Experimental study on two ir absorption bands of sulfuric acid. Absorption coefficients were measured and the temperature dependence of H_2SO_4 dissociation into

SO_3 and H_2O in the 127°-220°C temperature range was determined. Data are presented graphically and in two tables.

Evstafeva, O.N., and Klushina, T.V., 1973, [Infrared absorption spectra of alkali metal selenites]: Zhurnal Neorganicheskoi Khimii, v. 18, no. 6, p. 1459-1464. In Russian.

The infrared absorption spectra of some alkali metal selenites are presented and discussed. [Translation unavailable to authors. Data taken from Chem. Abs. 79:71936b, 1973.]

Eysel, H.H., and Siebert, Hans, 1969, [Raman spectra of the disulfides $M(II)S_2$]: Zhurnal Naturforsch, v. 24, no. 7, p. 932-933. In German.

Experimental study on the Raman spectra of FeS_2 and other metal sulfides. Data are presented in tables. [Translation unavailable to authors. Data taken from Chem. Abs. 71:75975w, 1969.]

Ferraro, J.R., and Fink, Uwe, 1977, Near infrared reflectance spectra and analysis of H_2S frost as a function of temperature: The Journal of Chemical Physics, v. 67, no. 2, p. 409-413.

Experimental study on the reflection spectra of H_2S frost in the near infrared region (1.6-4 um) over the temperature range 62-143 K. Data are given in tables and on a graph.

Fleming, J.W., 1976, Far i.r. rotational absorption spectra of H_2S, SO_2, NO_2: Spectrochimica Acta, v. 32A, no. 4, p. 787-795.

Experimental study on the far i.r. rotational absorption spectra of H_2S, SO_2, and NO_2 between 10 cm^{-1} and 40 cm^{-1} at a resolution of 0.05 cm^{-1} with comparisons to earlier studies. Data are presented graphically and in tables.

Fleming, J.W., 1977, Gas phase i.r. absorption spectrometry at extremely long wavelengths (714um - 1667 um): Spectrochimica Acta, v. 33A, no. 8, p. 787-791.

Experimental study on the rotational spectra of several gases (including H_2S and SO_2) at extremely long wavelengths using Fourier interferometric spectrophotometry. Data are presented in tables and spectra are shown in several figures.

Fouche, D.G., and Chang, R.K., 1971, Relative Raman cross section for N_2, O_2, CO, CO_2, SO_2, and H_2S: Applied Physics Letters, v. 18, no. 12, p. 579-580.

Experimental study on the Raman cross sections of various gases of interest in atmospheric pollutant studies as measured at 5145Å. Data are listed in tabular form.

Fox, M.F., and Hunter, T.F., 1969, Charge-transfer-to-solvent spectra: Nature, v. 223, no. 5202, p. 177-178.

Experimental study on the ultraviolet absorption spectra of simple inorganic anions, including hydroxide, with an explanation for the broad structureless bands characterized as charge-transfer-to-solvent transitions. Data are presented in a table and a graph.

Furuhashi, Akiko, Noguchi, Kazuo, Kawai, Shigeyuki, and Hayakawa, Yasumasa, 1970, Polarographic and spectroscopic studies on chalcogen dioxides in acid media: Denki Kagaku, v. 38, no. 5, p. 340-343.

Experimental study on the ultraviolet absorption spectra of sulfur (IV), selenium (IV), and tellurium (IV) dioxides in various acids in the wavelength range 220 to 340 mu. Data are presented graphically and in a table.

Futekov, L., and Iordanov, N., 1971, [Selenium dioxide-hydrogen chloride-water system studied using Raman spectra with a view to analytical application of the system]: Izvestiia Fizicheskiia Instituts ANEB, Bulgarska Akademiin Naukite, Sofia, v. 21, p. 289-292. In Bulgarian.

Experimental study on the Raman spectra of SeO_2 and $SeOCl_2$ in strongly acidic HCl solutions. [Translation unavailable to authors. Data taken from Chem. Abs. 77:96463s, 1972.]

Garg, C.L., Gupta, S.D., and Narasimham, K.V., 1970, Force constants and bond distances for the U-O bond of uranyl salts: Indian Journal of Pure and Applied Physics, v.8, no. 2, p. 108-110.

Theoretical study on U-O bond distances. Force constants for U-O were calculated using vibrational data from fluorescence and infrared investigations for several uranyl salts. Results are plotted on a graph and listed on a table.

Gerard, A., 1967, [Moessbauer effect and bond nature in some semimetallic iron compounds]: Colloques Internationaux de Centre National de la Recherche Scientifique, No. 157, p. 55-61. In French.

Experimental study on several semimetallic iron compounds (including sulfides and selenides) revealing a Moessbauer spectrum of two lines each arising from quadrupole coupling. Data are presented graphically and in tabular form.

Gerding, H., and Ypenburg, J.W., 1967, Some remarks on the vibrational spectra of liquid and solid sulfur dioxide: Recueil des Travaux Chimiques des Pays-Bas, v. 86, no. 5, p. 458-462.

Tabulation of vibrational spectral data of solid and liquid SO_2 determined from ir and Raman spectral measurements with comparisons to previously published results. Vibrational frequencies of SO_2 in different regions are discussed.

Giggenbach, W., 1971, Optical spectra of highly alkaline sulfide solutions and the second dissociation constant of hydrogen sulfide: Inorganic Chemistry, v. 10, no. 7, p. 1333-1338.

Experimental study on a newly observed band in the uv absorption spectra of highly alkaline sulfide solutions attributed to the formation of S^{2-} ion. Upper limits for the second dissociation constant of hydrogen sulfide are determined for temperatures as high as 250°C.

Data are presented graphically.

Giggenbach, W., 1971, The blue solutions of sulfur in water at elevated temperatures: Inorganic Chemistry, v. 10, no. 6, p. 1306-1308.

Experimental study on the equilibrium relations in polysulfide solutions as a function of temperature using absorption spectra. Bisulfide-hydrogen sulfide solutions were used to buffer the pH at various values between 4.7 and 10.6. Data are presented graphically and in the text.

Giguere, P.A., and Herman, Kazimiera, 1970, Studies on hydrogen-oxygen systems in the electrical discharge. IV. Spectroscopic identification of the matrix-stabilized intermediates, H_2O_3 and H_2O_4: Canadian Journal of Chemistry, v. 48, no. 22, p. 3473-3482.

Experimental study on the infrared absorption of the products from electrically dissociated H_2O and D_2O vapor and other hydrogen-oxygen systems at liquid nitrogen temperature measured between 4000 and 300 cm^{-1}. Data are presented graphically and in tables.

Gillespie, R.J., and Pez, G.P., 1969, Infrared and Raman spectra of the Se_4^{2+} ion: Inorganic Chemistry, v. 8, no. 6,

p. 1229-1233.

Experimental study of the infrared and Raman spectra of a number of compounds containing the polyatomic cation Se_4^{2+}. Data are presented in one table and several figures.

Gorller-Walrand, C., and Vanquickenbourne, L.G., 1971, Identification of the lower transitions in the spectra of uranyl complexes: The Journal of Chemical Physics, v. 54, no. 10, p. 4178-4186.

A qualitative and comparative study of the effects of ligation on the uranyl spectrum. The results are presented in tabular form.

Gorobets, B.S., Engoyan, S.S., and Sidorenko, G.A., 1977, [Study of uranium and uranium-containing minerals using luminescence spectra]: Atomnaya Energiya, v. 42, no. 3, p. 177-182. In Russian.

Compilation of the luminescence spectra of a large variety of uranium minerals plus a tabulation of electron-vibrational frequencies of uranyl in mineral species at 77 K. [Translation unavailable to authors. Data taken from Chem. Abs. 87:104533p, 1977.]

Goulden, J.D.S., and Manning, D.J., 1967, Infra-red spectroscopy of inorganic materials in aqueous solution: Spectrochimica Acta, v. 23A, no. 1, p. 2249-2254.

Experimental study of the ir spectra of several inorganic materials in aqueous solution, including several sulfur species, over the range 1550 to 950 cm^{-1}. Data are presented in both spectra diagrams and tables.

Gribov, L.A., Zubkova, O.B., and Rybal'chenko, I.V., 1977, [One possibility for an approximate calculation of the vibrational spectra of crystals]: Zhurnal Prikladnoi Spektroskopii, v. 27, no. 6, p. 1038-1041. In Russian.

Theoretical study of the vibrational spectra of uraninite (UO_2), and other minerals, using a simplified selection model of the structures studied. [Translation unavailable to authors. Data taken from Chem. Abs. 88:96852v, 1978.]

Gurman, V.S., and Sergeev, G.B., 1970, [Ultraviolet absorption spectrum of a glassy 17.5M solution of hydrogen peroxide in water at 77°K]: Zhurnal Fizicheskoi Khimii, v. 44, no. 3, p. 803-804. In Russian.

Experimental study on the absorption spectrum of a 17.5M solution of H_2O_2 in water from 265-320 nm.

[Translation unavailable to authors. Data from Chem. Abs. 73:9045h, 1970.]

Helminger, Paul, Cook, R.L., and De Lucia, F.C., 1971, Microwave spectrum and centrifugal distortion effects of HDS: Journal of Molecular Spectroscopy, v. 40, no. 1, p. 125-136.

Experimental study on the rotational spectrum of hydrogen deuterium sulfide in the ground vibrational state using microwave techniques. Twenty-seven new transitions were measured in the millimeter and submillimeter wavelength region. Data are presented in tabular format.

Helminger, Paul, De Lucia, F.C., and Kirchhaff, W.H., 1973, Microwave spectra of molecules of astrophysical interest IV. Hydrogen sulfide: Journal of Physical Chemistry Reference Data, v. 2, no. 2, p. 215-223.

Critical review of the available data on the microwave spectrum of hydrogen sulfide. Molecular data such as rotational constants, centrifugal distortion constants, hyperfine coupling parameters, and dipole moments are tabulated.

Helminger, Paul, and De Lucia, F.C., 1975, The ground state rotational spectrum of H_2Se: weighted

microwave-infrared analysis: Journal of Molecular Spectroscopy, v. 58, no. 3, p. 375-383.

Experimental study on transitions of the five major species of hydrogen selenide in the 100-600 GHz region of the microwave spectrum. Data are presented in tabular form.

Helminger, Paul, and De Lucia, F.C., 1977, Pressure broadening of hydrogen sulfide: Journal of Quantitative Spectroscopy and Radiative Transfer, v. 17, no. 6, p. 751-754.

Experimental study on microwave measurements of the self-broadening parameters of four pure rotational transitions of H_2S in the 50-60 GHz and 150-400 GHz regions. Data are given in a table and on graphs.

Henrion, W., 1967, Reflectivity measurements on trigonal selenium single crystals in the spectral region between 1.6 and 6.0 eV: Physica Status Solidi, v. 22, no. 1., p. K33-K37.

Experimental study on Se single crystals grown by sublimation from the vapor phase using absorption reflectivity measurements at 90 and 300 K. Spectra are shown in two figures and data are given in a table.

Hochenbleicher, J.G., Kloeckner, W., and Schroetter, H.W., 1974, [Determination of Raman spectra of gases]: Laser-tagung Stand der Anwendungstechnik von Lasern auf dem Gebiet der Luftreinhaltung Bietraege Zur Vortragsverantstaltung, p. 191-204. In German.

Experimental study on the Raman scattering cross sections of several important gases including SO_2 and H_2S using Ar-ion laser generation. [Translation unavailable to authors. Data taken from Chem. Abs. 86:10242v, 1977.]

Holzer, W., Murphy, W.F., and Bernstein, H.J., 1969, Raman spectra of negative molecular ions doped in alkali halide crystals: Journal of Molecular Spectroscopy, v. 32, no. 1, p. 13-23.

Experimental study on the Raman spectra of S_2^-, S_3^-, Se_2^- and SeS^- in alkali halide single crystals. Data are presented in both graphical and tabular format.

Il'inskaya, T.A., Kuzin, V.I., and Tolmachev, Yu.M., 1969, [Absorption spectra of uranium oxides. II. Infrared spectra of oxides in the region of compositions from $UO_{2.50}$ to $UO_{2.64}$]: Radiokhimiya, v. 11, no. 4, p. 433-438. In Russian.

Experimental study on the ir absorption spectra of a series of uranium oxides of varying compositions. [Translation unavailable to authors. Data taken from Chem. Abs. 71:130380A, 1969.]

Ishibashi, Y., Sawada, A., Wada, M., and Takagi, Y., 1977, [Raman spectra of potassium selenium (VI) oxide]: Izvestiia Akademii Nauk SSSR, Seriia fizicheskaya, v. 41, no. 3, p. 592-598. In Russian.

Experimental study on the Raman spectrum of K_2SeO_4. [Translation unavailable to authors. Data taken from Chem. Abs. 86:197156k, 1977.]

Jager, H., Kieschke, H.G., and Lochte-Holtgreven, W., 1968, Absorption spectra of small iron particles dispersed in various gases and observation of absorption bands from highly excited states of the gas molecules: Physics Letters, v. 26A, no. 9, p. 440-441.

Data from previous work on the absorption spectra of small iron particles dispersed in nitrogen, argon, or hydrogen show a continuous absorption which can be fitted to curves calculated according to Mie's theory. In addition, a number of absorption bands due to highly excited molecules of the carrier gas have been described.

Jakobsson, L.R., 1967, The infrared spectrum of the neutral sulphur atom: Arkiv Foer Fysik, v. 34, no. 2, p. 19-31.

Experimental study of the infrared spectrum of sulfur over the range 9212 to 34,270 Å by means of a high-frequency discharge through sulfur dioxide. Data are shown in tabular form as well as in three figures.

James, D.W., and Frost, R.L., 1978, Structure of aqueous solutions: Journal of the Chemical Society, Faraday Transactions 1, v. 74, n. 3, p. 583-596.

Experimental study of structure making and structure breaking by dissolved electrolytes using infrared librational bands. The concentration dependence of the ir librational band of water was studied for forty-six electrolytes. Data are presented in both tables and graphs.

Jaseja, T.S., Parkash, Ved, Dheer, M.K., and Sethi, S.C., 1971, Stimulated Raman emissions from sulfuric acid: The Journal of Chemical Physics, v. 54, no. 3,p. 1419-1421.

Experimental study of the stimulated Raman spectrum of sulfuric acid as a function of concentration. Data are presented in a table and in the text.

Jatkar, S.K.K., Khedekar, A.V., and Mukhedkar, A.J., 1968, The nature of bonding in uranyl ion. II. Interpretation of absorption spectra and magnetism of uranyl: Journal of the University of Poona, Science Section, no. 34, p. 67-72.

Theoretical discussion on the type of bonding in UO_2^{2+} and the nature of magnetic and absorption spectral data. Two M.O. diagrams are presented.

Jezowska-Trzebiatowska, B., Droxdzynski, J., and Bukietynska, K., 1969, Electronic spectra of U^{+3} ion: Bulletin de L'Academie Polonaise des Sciences, Serie des Sciences Chimiques, v. 17, no. 5., p. 295-300.

Experimental study on the U^{+3} electronic absorption spectrum in anhydrous MeOH, HOAc, and HCO_2H saturated with dry H_2 in the range between 7000 and 26,000 cm^{-1}. Data are presented graphically.

Jones, M.C., 1969, Far-infrared absorption in liquid hydrogen: The Journal of Chemical Physics, v. 51, no. 9, p. 3833-3844.

Experimental study on the far-infrared spectra of liquid hydrogen from 20 to 250 cm^{-1}. Data are shown

graphically.

Kammori, Ohiko, Sato, Kimitaka, and Kurosawa, Furnio, 1968, [Application of infrared absorption spectra to the study of iron and steels. V. Infrared absorption spectra of metal carbides, nitrides, and sulfides]: Bunseki Kagaku, v. 17, no. 10, p. 1270-1273. In Japanese.

Experimental study of the ir absorption spectra of several compounds (including FeS and FeS_2) over the range 1400-400 cm^{-1} using the KBr disc technique. [Translation unavailable to authors. Data taken from Chem. Abs. 70:42454b, 1969.]

Kammori, Ohiko, Yamaguchi, Naoharu, and Sato, Kimitaka, 1967, [Application of infrared absorption spectrum to studies on iron and steel. I. Infrared Absorption spectra of metal oxides]: Bunseki Kagaku, v. 16, no. 10, p. 1050-1055. In Japanese.

Experimental study on the ir absorption spectra of 25 metal oxides (including iron) over the range 1400-400 cm^{-1}. [Translation unavailable to authors. Data taken from Chem. Abs. 69:6597w, 1968.]

Karimova, A.F., Vishnevskaya, G.P., and Kozyrev, B.M., 1973, [Paramagnetic relaxation and ESR spectra of aqueous

solutions of trivalent iron]: Doklady Akademii Nauk SSSR, v. 212, no. 5,, p. 1142-1145. In Russian.

Experimental study of the relaxation times of concentrated aqueous solutions of ferric sulfate and ferric nitrate by a nonresonance absorption method. Data are presented graphically.

Karlsson, Leif, Mattsson, Lars, Jadrny, Reinhard, Bergmark, Torsten, and Siegbahn, Kai, 1976, Vibrational and vibronic structure in the valence electron spectrum of H_2S: Physica Scripta, v. 13, no. 4, p. 229-234.

Experimental study on the photoelectron spectrum of H_2S. The energics of the observed vibrational and vibronic bands are also reported. Data are presented graphically and in a table.

Karr, Clarence, Jr., and Kovach, J.J., 1969, Far-infrared spectroscopy of minerals and inorganics: Applied Spectroscopy, v. 23, no. 3, p. 219-223.

Experimental determination of the far-infrared spectra, 200 to 50 cm^{-1}, of 18 different minerals and inorganic compounds. Included among these is ferrous sulfate in the surface film on pyrite. Data are presented both graphically and in tabular form.

Kasper, H., and Drickamer, H.G., 1968, High-pressure Moessbauer resonance studies of compounds of iron with group V and group VI elements: Proceedings of the U.S. National Academy of Science, v. 60, no. 3, p. 773-775.

Experimental study on the anomalous behavior of compounds of iron with sulfur, selenium, and other elements using high-pressure Moessbauer resonance techniques. Data are presented in a table and in two figures.

Keil, R., 1969, [Selective spectrophotometric determination of uranium]: Fresenius' Zeitschrift fuer Analytische Chemie, v. 244, n. 3, p. 165-169. In German.

Description of an analytical procedure for the spectrophotometric determination of uranium, [Translation unavailable to authors. Data taken from Chem. Abs. 70:84030r, 1969.]

Khandelwal, B.L., and Verma, V.P., 1976, Liquid-liquid distribution, spectrophotometric, thermal, ir, and Raman studies on selenito uranylates: Journal of Inorganic and Nuclear Chemistry, v. 38, no. 4, p. 763-769.

Experimental study of a number of properties of uranyl selenites. Spectrophotometric studies were conducted in

the 370-500 nm region while ir and Raman spectra were recorded in the 250-4000 cm^{-1} region. Data are given in tables and on graphs.

Kirkbright, G.F., and Ranson, Leslie, 1971, Use of the nitrous oxide-acetylene flame for determination of arsenic and selenium by atomic absorption spectrometry: Analytical Chemistry, v. 43, no. 10, p. 1238-1241.

Description of an improved analytical technique for the determination of arsenic and selenium using atomic absorption spectrometry.

Klyuchnikov, N.G., Erygin, G.D., and Verizhskaya, E.V., 1971, [Change in the hydration number and the infrared spectra of sulfuric acid solutions after treatment in a magnetic field]: Uch. Zap. Mosk. Gos. Pedagog. Inst., v. 340, p. 340-344. In Russian.

Experimental study on the effect of a magnetic field on the ir spectra of aq. H_2SO_4 in the 400-4000 cm^{-1} region. [Translation unavailable to authors. Data taken from Chem. Abs. 77:120376p, 1972.]

Koh, Tomozo, Miura, Yasuyuki, and Katoh, Masahide, 1977, Photometric determination of micro amounts of thiosulphate by means of its cyanolysis with

lanthanum(III) as catalyst: Talanta, v. 24, no. 12, p. 759-761.

Analytical procedure for the photometric determination of thiosulphate using cyanolysis with lanthanum as catalyst at 460 nm. Results are presented in tables and graphs.

Komyak, A.I., and Volod'ko, L.V., 1969, [Analysis of the absorption spectra fine structure of uranyl nitrate crystals at 77 degrees K]: Vestsi Akademii Navuk Belaruskai SSR, Seriya Fizika Matematychnykh Navuk, (1), p. 115-120. In Belorussian.

Experimental study on the absorption spectra of uranyl nitrate crystals at 77 K in both ordinary and polarized light. [Translation unavailable to authors. Data taken from Chem. Abs. 71:17311r, 1969.]

Korolev, V.V., and Bazhin, N.M., 1975, [State of iron (2+) ions in aqueous sulfuric acid solutions]: Zhurnal Neorganicheskoi Khimii, v. 20, no. 3, p. 701-705. In Russian.

Experimental study on the uv, visible, and ir spectra of Fe^{2+} solutions in H_2SO_4 and $HClO_4$. [Translation unavailable to authors. Data taken from Chem. Abs. 83:16598a, 1975.]

Koster, A.S., 1971, L emission spectra of compounds of iron and manganese: Proceedings Koninklijke Nederlandse Akademie van Wetenschappen, Ser. B, v.74, no. 3, p. 332-339.

Experimental study on the L emission profiles of Fe, FeO, Fe_3O_4, Fe_2O_3, FeS, FeS_2, FeF_3, Mn, MnO, MnO_2, and $KMnO_4$. Data are presented in tables and on graphs.

Kramer, L.N., and Klein, M.P., 1969, Chemical shifts in core electron binding energies of iron and sulfur in iron complexes determined by photoelectron spectroscopy: The Journal of Chemical Physics, v. 51, no. 8, p. 3618-3620.

Experimental study on the binding energies of several compounds containing both iron and sulfur. Data are presented graphically and in the text.

Kushawaha, V.S., and Pathak, C.M., 1974, Electronic emission spectrum of SeO_2: Spectroscopy Letters, v. 7, no. 3, p. 161-174.

Experimental study on the electronic emission spectrum of SeO_2 in the 4000-6000Å region. Experimental data are given in several tables.

Lakshminarayana, G., and Narasimham, N.A., 1967, A new electronic transition of S_2 in the vacuum ultraviolet region: Current Science, v. 36, no. 20, p. 533.

Experimental study on the emission spectrum of S_2 excited in an electrodeless microwave discharge through sulfur and helium. A new band system in the 1780-1850 Å region is described. Data are given in a table and the spectrum is shown in a figure.

Lau, K.Y., and Lott, P.F., 1971, An indirect atomic-absorption method for the determination of selenium: Talanta, v. 18, no. 3, p. 303-310.

An indirect atomic-absorption method for the determination of selenium using two reactions that lead to the formation of the $Pd(DanSe)_2Cl_2$ complex and measurement of the palladium absorption. Data are presented in tables and on graphs.

LaVilla, R.E., 1975, The sulfur K_B emission and K-absorption spectra from gaseous H_2S. III: The Journal of Chemical Physics, v. 62, no. 6, p. 2209-2212.

Experimental study on the sulfur K_B emission in fluorescence and K absorption from gaseous H_2S. Data are presented on a graph and in a table.

Leiga, A.G., 1968, Optical properties of trigonal selenium in the vacuum ultraviolet: Journal of the Optical Society of America, v. 58, no. 7, p. 880-884.

Experimental study on the optical properties of trigonal selenium single crystals between 4 and 14.4 eV. Data are presented graphically.

Levinson, L.M., and Treves, D., 1968, Moessbauer study of the magnetic structure of Fe_7S_8: Journal of Physics and Chemistry of Solids, v. 29, no. 12, p. 2227-2231.

Experimental Moessbauer study of laboratory prepared Fe_7S_8 both with and without the presence of an applied external magnetic field. Data are presented graphically and in a table.

Li, E.K., Johnson, K.H., Eastman, D.E., and Freeouf, J.L., 1974, Localized and bandlike valence-electron states in FeS_2 and NiS_2: Physics Review Letters, v. 32, no. 9, p. 470-472.

Experimental study on the photoemission spectra of FeS_2 and NiS_2 in the range $20<hv<50$ eV. Data are given in the text and on graphs.

Lodato, V.A., 1971, Line broadening of uranyl salts at low temperature: Journal of Physics and Chemistry of Solids, v. 32, no. 5, p. 1087-1090.

Theoretical study on the loss of high resolution at low temperatures in the fluorescence spectra of uranyl salts. A model is presented.

Lowder, J.E., Kennedy, L.A., Sulzmann, K.G.P., and Penner, S.S., 1970, Spectroscopic studies of hydrogen bonding in H_2S: Journal of Quantitative Spectroscopy and Radiation Transfer, v. 10, no. 1, p. 17-23.

Experimental study on H_2S using quantitative infrared intensity measurements in the 4 mu region at a constant pressure of 20.2 atm. and a temperature range of 295-448 K. The energy of hydrogen bonding in the gas phase was estimated. Data are presented graphically.

Lucovsky, G., Mooradian, A., Taylor, W., Wright, G.B., and Keezer, R.C., 1967, Identification of the fundamental vibrational modes of trigonal alpha-monoclinic and amorphous selenium: Solid State Comunications, v. 5, no. 2, p. 113-117.

Experimental study on the infra-red and Raman spectra of trigonal, alpha-monoclinic, and amorphous Se and

identification of the frequencies and symmetry characters of the fundamental vibrational modes. Data are presented in tables.

Lutz, H.D., and Willich, P., 1974, [Lattice vibration spectra. IX. Pyrite structure. Far infrared spectra and normal coordinate analysis of MnS_2, FeS_2, and NiS_2]: Zeitschrift fur Anorganische und Allgemeine Chemie, v. 405, no. 2, p. 176-182. In German.

Experimental study on Fir absorption spectra of MnS_2, FeS_2, and NiS_2 in the range 600 to 30 cm^{-1}. Data are presented in tables and one spectrum trace.

Majchrzak, Kazimierz, 1971, [Equilibria in solutions and anion exchange of uranium (VI) complexes. III. The composition of uranium (VI) complexes sorbed on an anion-exchange resin from sulfate solutions]: Nukleonika, v. 18, no. 7-8, p. 325-336. In Polish.

Experimental study on the absorption spectra (400-500 nm) of uranium (VI) complexes sorbed on anion-exchange resin from sulfate solutions. Data are presented graphically.

Majchrzak, Kazimierz, 1973, [Equilibria in solutions and anionic exchange of uranium (VI) complexes. IV. Stability constants and sorption of uranyl sulfate complexes]:

Nukleonika, v. 18, no. 3, p. 105-119. In Polish.

Experimental study on the equilibria of formation of uranyl sulfate complexes. Absorption spectra (400-500 nm) of uranyl sulfate complexes are also presented graphically.

Majkowski, R.F., Blint, R.J., and Hill, J.C., 1978, Infrared absorption coefficients of gaseous H_2SO_4 and SO_3: Applied Optics, v. 17, no. 7, p. 975-977.

Experimental study on the influence of partial pressure variations on the absorption spectrum of gaseous H_2SO_4 and SO_3 in the infrared region. Data and spectra are presented graphically.

Mandravel, Cristina, and Gutul, Melania, 1967, [Solutions in selenic acid]: Studii si Cercetari de Chimie, v. 15, no. 12, p. 885-892. In Romanian.

Experimental study on the ir spectra of H_2SeO_4 in various other acids. [Translations unavailable to authors. Data taken from Chem. Abs. 69:54701x, 1968.]

Manning, P.G., 1967, Absorption spectra of Fe(III) in octahedral sites in sphalerite: The Canadian Mineralogist, v. 9, n. 1, p. 57-64.

Experimental spectrophotometric study of thin sections of natural Fe-containing sphalerite in the energy range 10,000-30,000 cm^{-1}. The absorption was resolved into a number of energy bands characteristic of octahedrally bound Fe (III). Data are presented graphically and in two tables.

Martin, J.J., Cavagnat, R., Daleau, G., and Deuaure, J., 1975, [Cell permitting the study of Raman spectra of compressed liquids up to 3,000 bars]: Analusis, v. 3, no. 6, p. 332-335. In French.

Experimental study on the Raman spectra of HSO_4^- and SO_4^{2-} from 1 to 3000 atm in an experimental cell. [Translation unavailable to authors. Data from Chem. Abs. 83:88559n, 1975.]

Mazalov, L.N., Sadovskii, A.P., Bertenev, V.M., Murakhtanov, V.V., Gal'tsova, E.A., and Chernyavskii, A.V., 1971, [X-ray spectra of hydrogen sulfide and its electronic structure: Teoreticheskaia Eksperimental'naia Khimiia, v. 7, no. 1, p. 46-53. In Russian.

Experimental study of the x-ray emission and absorption K spectra of gaseous H_2S with interpretation and discussion of the results. [Translation unavailable to

authors. Data taken from Chem. Abs. 75:81919e, 1971.]

Melendres, C.A., and Tani, B., 1978, Moessbauer spectra and lattice parameters of some new sulfide phases of iron: The Journal of Physical Chemistry, v. 82, no. 26, p. 2850-2852.

Experimental study on the Moessbauer spectra of several iron sulfide phases found in the charged and discharged electrodes of molten salt secondary batteries at room temperature and at 77 K. Spectra are displayed graphically and data are listed in a table.

Mendes-Bezerra, A.E., and Uden, P.C., 1968, Determination of sulfate by titrimetric and colorimetric measurement of equivalent displaced zinc ion: Analytical Letters, v. 1, no. 6, p. 355-358.

Two analytical procedures are given for the determination of sulfate in the 0.2 - 100 mg. range. Pertinent information is given in the text.

Meyer, B., Oommen, T.V., and Jensen, D., 1971, The color of liquid sulfur: The Journal of Physical Chemistry, v. 75, no. 7, p. 912-917.

Experimental study on the visible spectrum of liquid

sulfur between the melting point and 700°C at 10 atm., as well as the absorption spectra of various gas phases, solids, and solutions of sulfur. Data are presented graphically.

Meyer, B., Stroyer-Hansen, T., Jensen, D., and Oommen, T.V., 1971, The color of liquid sulfur: Journal of the American Chemical Society, v. 93, no. 4, p. 1034-1035.

Experimental study on the absorption spectrum of liquid sulfur in the temperature range between the melting point and 700°C. Data are given graphically and in the text.

Miller, R.E., and Leroi, G.E., 1968, Raman spectra of polycrystalline H_2S and D_2S: The Journal of Chemical Physics, v. 49, n. 6, p. 2789-2797.

Experimental study on the Raman spectra of H_2S and D_2S in each of their three solid phases using both laser and conventional excitation. Data are presented graphically and in tabular format.

Miller, R.E., Leroi, G.E., and Hard, T.M., 1969, Analysis of the pure rotational absorption spectra of hydrogen sulfide and deuterium sulfide: The Journal of Chemical Physics, v. 50, no. 2, p. 677-684.

Experimental study of the far-infrared spectra of H_2S, D_2S, and H_2S - D_2S mixtures at low pressures with high resolution. Data are presented graphically and in tables.

Miller, R.E., Leroi, G.E., and Eggers, D.F., 1967, Infrared spectrum of deuterium sulfide: The Journal of Chemical Physics, v. 46, no. 6, p. 2292-2297.

Experimental study of the infrared spectrum of deuterium sulfide with investigation of its bending fundamental (v2) at high resolution and calculation of inertial constants. Data are presented in both tables and graphs.

Mohler, E., Stuke, J., and Zimmerer, G., 1967, Some new features of the reflectance spectrum of trigonal selenium single crystals: Physica Status Solidi, v. 22, no. 1, p. K49-K53.

Experimental study on selenium in the energy range 1.85 to 9.2 eV using reflectivity measurements with a qualitative discussion of the observed structure. Spectrum and structural diagrams are given in two figures.

Molina, L.T., Schinke, S.D., and Molina, M.J., 1977, Ultraviolet absorption spectrum of hydrogen peroxide vapor:

Geophysical Research Letters, v. 4, no. 12, p. 580-582.

Experimental study on the ultraviolet absorption spectrum of hydrogen peroxide vapor over the wavelength range 210 to 350 nm at 296 K. Data are presented in a table and in a figure.

Montano, P.A., 1977, Moessbauer spectroscopy of iron compounds found in West Virginia coals: Fuel, v. 56, no. 4, p. 397-400.

Experimental study of iron pyrite and iron (II) sulfate in coal samples from various seams in West Virginia. Evidence for the formation of a new mineral species during the low-temperature ashing process is presented. The data are presented graphically and in a table.

Morillon, C., 1970, [Emission spectra of samarium, neodymium, and uranium between 2.3 and 4.1 micrometers studied with a grating spectrometer]: Spectrochimica Acta, v. 25B, no. 10, p. 513-538. In French.

Experimental study on the emission lines of samarium, neodynium, and uranium. About 300 lines of U in the range 2.3 to 3.4 micrometers were measured. Data are given in tabular form.

Moriyasu, Masataka, Yokoyama, Yu, and Ikeda, Shigero, 1977, Quenching of uranyl luminescence by water molecule: Journal of Inorganic and Nuclear Chemistry, v. 39, no. 12, p. 2211-2214.

Experimental study of the quenching of uranyl luminescence by water molecules. The authors conclude that an electron transfer mechanism in terms of oxidation-reduction potentials of uranyl ion and water molecules is involved. Data are presented in tables and one figure.

Moriyasu, Masataka, Yokoyama, Yu, and Ikedo, Shigero, 1977, Anion coordination to uranyl ion and the luminescence lifetime of the uranyl complex: Journal of Inorganic and Nuclear Chemistry, v. 39, no. 12, p. 2199-2203.

Experimental study of the nonexponential uranyl luminescence decay curves of uranyl complexes in the wavelength range 470-620 nanometers at 25°C. Data are presented graphically and in tables.

Moriyasu, Masataka, Yokoyama, Yu, and Ikedo, Shigero, 1977, Quenching mechanisms of uranyl luminescence by metal ions: Journal of Inorganic and Nuclear Chemistry, v. 39, no. 12, p. 2205-2209.

Experimental study of the quenching reaction of uranyl luminescence by metal ions in a lower valence state such as Fe^{2+}. The authors conclude that the reaction is diffusion-controlled and that the dominant process is an electron transfer from the quenchers to the uranyl ion. Data are presented in several tables and two figures.

Morton, J.R., 1967, Identification of some sulfur-containing radicals trapped in single crystals: The Journal of Physical Chemistry, v. 71, no. 1, p. 89-92.

Experimental study on several sulfur-containing radicals in crystals of sodium thiosulfate and potassium bromide using electron spin resonance spectroscopy. Data are presented graphically and in tables.

Muller, Guenter, and Meier, Guenter, 1969, [Band spectroscopic isotope analysis of sulfur]: Spectrochimica Acta, Part B, v. 24, no. 1, p. 45-52. In German.

Experimental study on the determination of ^{34}S abundance using an electronic transition in the SO bands. [Translation unavailable to authors. Data taken from Chem. Abs. 70:72398d, 1969.]

Murray, P.J., 1977, Simultaneous acquisition of Moessbauer spectra and microbalance data in situ: A possible new

technique for the study of iron corrosion and oxidation: British Corrosion Journal, v. 12, no. 3, p. 192.

Experimental study on the Moessbauer spectra of iron foil suspended from the arm of a microbalance. Moessbauer spectra are presented in a figure.

Nakhmanson, M.S., Baranovskii, V.I., and Panin, A.I., 1972, [Electronic structure of sulfur dioxide, hydrogen sulfide, carbon disulfide molecules and x-ray spectra of sulfur in these compounds]: Vestnik Leningradsk Universiteta, Fizika Khimiia, no. 2, p. 35-42. In Russian.

Theoretical study of the electronic structure of SO_2, H_2S, and CS_2 with a comparison to the x-ray K-emission spectra. [Translation unavailable to authors. Data taken from Chem. Abs. 77:120261x, 1972.]

Narasimham, K.V., and Garg, C.L., 1969, Recent spectroscopic studies of uranyl solids. Published in Bhagavantam Volume, p. 84-94, edited by S. Bala Krishna, Bangalore, India.

Review and interpretation of the experimental results of recent studies of fluoresence, electronic absorption, Raman, and ir spectra on a variety of uranyl solids.

Nechiporenko, A.P., Kalinkin, I.P., Ventov, N.G. and Aleskovskii, V.B., 1969, [Microspectrophotometric titration of cadmium and sulfate ion]: Zavodskaya Laboratoriya, v. 35, no. 4, p. 432-433. In Russian.

An analytical titration technique for SO_4^{2-} is described using nichromazo as an indicator. [Translation unavailable to authors. Data taken from Chem. Abs. 71:35658 p, 1969.]

Nefedov, V.I., Buslaev, Yu.A., Sergushin, N.P., Bayer, L., Kukunov, Yu.V., and Kuznetsova, A.A., 1974, [Electronic structure of isoelectronic compounds]: Izvestiia Akademmi Nauk SSSR, Seriia Fizicheskaya, v. 38, no. 3, p. 448-461. In Russian.

The electronic structure of SO_4^{2-}, SO_3^{2-}, SeO_4^{2-}, SeO_3^{2-}, and other ligands was investigated using x-ray photoelectron spectra. [Translation unavailable to authors. Data taken from Chem. Abs. 81:19021b, 1974.]

Nefedov, V.I., Sergushin, N.P., Salyn, Y.V., Band, I.M., and Trzhaskovskaya, M.B., 1975, Relative intensities in x-ray photoelectron spectra. Part II: Journal of Electron Spectroscopy and Related Phenomena, v. 7, p. 175-185.

Experimental study on the relative intensities of x-ray photoelectron lines of several elements including selenium. Data are given in tables and on graphs.

Nekrasov, I.I., and Yagodovskaya, T.V., 1970, [Infrared spectra of the products of the low-temperature reaction of liquid ozone with atomic hydrogen]: Zhurnal Fizicheskoi Khimii, v. 44, no. 7, p. 1861-1863. In Russian.

Experimental study on the structure of H_2O_2 and higher peroxides of hydrogen using infrared absorption spectra. [Translation unavailable to authors. Data taken from Chem. Abs. 73:93097g, 1970.]

Nimon, L.A., Neff, V.D., Cantley, R.E., and Buttlar, R.O., 1967, The infrared and Raman spectra of S_6: Journal of Molecular Spectroscopy, v. 22, no. 1, p. 105-108.

Experimental study on the infrared and Raman spectra of hexatomic sulfur in the region 2000 cm^{-1} to 45 cm^{-1} with comparison to S_8. Data are presented in tabular form.

Oelfke, W.C., and Gordy, Walter, 1969, Millimeter - wave spectrum of hydrogen peroxide: The Journal of Chemical Physics, v. 51, no. 12, p. 5336-5343.

Experimental study on fifty rotational transitions of H_2O_2 in the ground vibrational state in the mm-wave region 60 to 300 kMc/sec. Data are presented in both tabular and graphical form.

Ohsawa, Akira, and Yamamoto, Hisao, 1974, X-ray photoelectron spectra of valence electrons in FeS_2, CoS_2, and NiS_2: Journal of the Physical Society of Japan, v. 37, p. 568.

Experimental study on the x-ray photoelectron spectra of some first series transition-metal disulfides. Data are given graphically.

Ohwada, K., 1967, I.R. spectra of uranyl ion attached to ion exchange resins: Journal of Inorganic and Nuclear Chemistry, v. 29, no. 7, p. 1802-1803.

Experimental study of the ir spectra of uranyl ion attached to various ion exchange resins over the range from 2000 to 650 cm^{-1}. Data are presented in tabular format.

Onishi, Hiroshi, and Toita, Yukio, 1969, [Spectrophotometric determination of uranium (VI) with Arsenazo III after separation from thorium by extraction]: Bunseki Kagaku,

v. 18, no. 5, p. 592-595. In Japanese.

A spectrophotometric analytical procedure for the determination of uranium (VI) after separation from thorium by extraction. [Translation unavailable to authors. Data taken from Chem. Abs. 71:67115A, 1969.]

Osaka, Toshiaki, and Takahashi, Shin-ichi, 1968, Far infrared absorption spectra of H_2S and D_2S: Journal of the Physical Society of Japan, v. 25, no. 6, p. 1654-1663.

Experimental study of the pure rotation spectra of H_2S and D_2S in the range 300 to 1500 mu using a far infrared spectrometer with a variable depth grating. Data are presented in several figures and tables.

Osaka, Toshiaki, and Takahashi, Shin-ichi, 1970, [Far infrared molecular spectroscopy. II. Pure rotation spectrum of deuterium sulfide]: Tohoku Daigaku Kagaku Keisoku Kenkyusho Hokoku 1969, v. 18, no. 2-3, p. 49-59. In Japanese.

Experimental study on the pure rotational spectrum of D_2S in the far-ir region from 33 to 6.6 cm^{-1}. [Translation unavailable to authors. Data taken from Chem. Abs. 73:93023e, 1970.]

Ozin, G.A., and Vander Voet, A., 1971, Matrix Raman spectra, molecular structure and vibrational analysis of SeO_2 and $(SeO_2)_2$: Journal of Molecular Structure, v. 10, no. 2, p. 173-182.

Experimental study on the Raman spectra of SeO_2 and $(SeO_2)_2$ at various temperatures. Data are presented graphically and in tables.

Pacansky, Jacob, and Calder, V., 1970, Matrix-isolation spectra of H_2S and D_2S: An example of the application of the uncoupled oscillator approximation: The Journal of Chemical Physics, v. 53, no. 12, p. 4519-4524.

Experimental study on the infrared spectra of H_2S and D_2S in krypton and argon matrices. The general quadratic valence force constants are calculated using an uncoupled oscillator approximation. Experimental data are given in tables and on a graph.

Pagsberg, P., Christensen, H., Rabani, J., Nilsson, G., Fenger, J., and Nielsen, S.O., 1969, Far-ultraviolet spectra of hydrogen and hydroxyl radicals from pulse radiolysis of aqueous solutions. Direct measurement of the rate of H + H^1: The Journal of Physical Chemistry, v. 73, no. 4, p. 1029-1038.

Experimental study on the pulse radiolytic absorption transients observed in aqueous solutions between 200 and 300 nm. Data are presented in both graphical and tabular format.

Pant, D.D., and Sanwal, D.N., 1967, Electronic states of uranyl ion: Proceedings of the 1st International Conference on Spectroscopy, Bombay, v. 1, p. 185-188.

Discussion of the absorption spectra of uranyl ion. Seven electronic transitions in the region 5000-1900 Å are described and classified into two broad groups. Data are presented in a table.

Pavlyuk, L.A., and Kryukov, P.A., 1976, [Spectrophotometric determination of the first ionization constant of hydrogen sulfide at elevated temperatures]: Izvestiia Sibirskogo Otdeleniia Akademii Nauk SSSR, Seriia Khimicheskokh Nauk, no. 6, p. 25-29. In Russian.

Experimental spectrophotometric determination of the thermodynamic pK_a for H_2S from 25-110°C. [Translation unavailable to authors. Data taken from Chem. Abs. 86:96816v, 1977.]

Perez-Bustamante, J.A. and Delgado Palomares, F., 1971, The extraction and spectrophotometric determination of

sexavalent uranium with arsenazo III in aqueous-organic media: Analyst, v. 96, p. 407-422.

Description of an analytical method for the determination of uranium (VI) using an extraction-spectrophotometric method.

Peytavin, S., Brun, G., Guillermet, J., Cot, L., and Maurin, M., 1972, [Vibrational spectra of sodium divalent metal double sulfates, $Na_2M(SO_4)_2 \cdot 4H_2O$ (M=Mg, Fe, Co, Ni, Zn)]: Spectrochimica Acta, v. 28a, p. 2005-2011. In French.

Experimental study on the vibration frequencies of some double salts of sodium and divalent metal sulfates using infrared and Raman spectroscopy. Data were taken over the range 4000-200 cm^{-1} and are presented in tables.

Phillips, L.F., Smith, J.J., and Meyer, Beat, 1969, Ultraviolet spectra of matrix isolated disulfur monoxide and sulfur dioxide: Journal of Molecular Spectroscopy, v. 29, no. 2, p. 230-243.

Experimental study on the UV absorption spectra of S_2O and SO_2. An empirical equation is presented to describe the observed bands in the spectrum of S_2O. Data are presented in both graphical and tabular form.

Pinaev, G.F., Stukan, R.A., and Makarov, E.F., 1977, [Moessbauer effect in iron (3+) selenites]: Zhurnal Neorganicheskoi Khimii, v. 22, no. 7, p. 1731-1733. In Russian.

Experimental study of the Moessbauer spectra of a number of hydrated ferric selenites. [Translation unavailable to authors. Data taken from Chem. Abs. 87:109005c, 1977.]

Platanov, A.N., Povarennykh, A.S., Tarashchan, A.N., and Bondar, V.V., 1972, [Color of uranyl-bearing minerals]: Zapiski Vsesoyuznogo Mineralogicheskogo Obshchestva, v. 101, no. 6, p. 423-428. In Russian.

Experimental study of the optical absorption spectra of several uranyl minerals. [Translation unavailable to authors. Data taken from Chem. Abs. 78:1267563, 1973.]

Podobedova, L.I., Kononov, E.Ya., and Koshelev, K.N., 1971, [Vacuum-ultraviolet spectra of multiply ionized sulfur atoms]: Optikai Spektroskopiia, v. 30, no. 3, p. 394-398. In Russian.

Experimental study on the spectra of transitions of various multiply ionized sulfur atoms in the 170-370 Å region. Data are given in tables.

Povarennykh, A.S., and Onishchenko, L.A., 1973, [Infrared spectra of selenates and selenites]: Geologicheskii Zhurnal (Russ. Ed.), v. 33, no. 6, p. 98-103. In Russian.

Tabulation of the ir spectra of several selenate and selenite minerals. [Translation unavailable to authors. Data taken from Chem. Abs. 80:62035a, 1974.]

Powers, D.A., Rossman, G.R., Schugar, H.J., and Gray, H.B., 1975, Magnetic behavior and infrared spectra of jarosite, basic iron sulfate, and their chromate analogs: Journal of Solid State Chemistry, v. 13, p. 1-13.

Experimental study on the magnetic behavior and infrared spectroscopic features of hydronium jarosite, basic iron sulfate and other polymeric, extended-lattice ferric compounds. Spectra were taken over the range 4000 to 40 cm^{-1}. Data are presented in tables and on graphs.

Prins, G., 1973, Investigations on uranyl chloride, its hydrates, and basic salts: Reactor Centrum Nederland Report No. 186, 122 p.

Experimental study of the vibrational spectra of UO_2Cl_2, its hydrates, and five other uranyl compounds using Raman and infrared techniques. The stretching

frequencies of the uranyl group are discussed. Data are presented in tabular form.

Pushkin, V.T., Zen'kovskii, A.G., Golitsyn, A.N., Moskalenko, N.I., and Pluzhnikov, A.I., 1978, [Experimental determination of the spectral radiational characteristics of sulfur dioxide]: Promyshlennaya Energetika, no. 7, p. 46-47. In Russian.

Experimental study of the transmission spectrum of SO_2 at 0.1 MPa and 293 K. [Translation unavailable to authors. Data taken from Chem. Abs. 89:138253d, 1978.]

Rahim, S.A., and West, T.S., 1970, Absorptiometric determination of sulphide ion: Talanta, v. 17, n. 9, p. 851-856.

Experimental study on an absorptiometric analytical method for sulphide ion based on the green colour formed when sulphide ions are treated in ammoniacal solution with iron(III) and an excess of nitrilotriacetic acid. Data are given in the text and in a table. The absorption spectra are presented diagrammatically.

Ramanauskas, E.I., and Shulyunene, A.K., 1968, The use of the reaction between iodides and brilliant green and malachite green for the spectrophotometric determination of micro amounts of selenium: Zhurnal Analiticheskoi

Khimii, v. 23, no. 12, p. 1859-1860.

An analytical procedure for the indirect determination of selenium using the reaction between iodides and brilliant green and malachite green. Pertinent data are presented in two tables.

Rao, K.V.S., and Symons, M.C.R., 1972, Oxides and oxyions of the non-metals. Part XV. Electron spin resonance spectra of some selenium and bromine radicals: Journal of the Chemical Society, Dalton Transactions, v. 2, p. 147-150.

Experimental study of the electron spin resonance spectra of SeO_2^-, SeO_3^-, SeO_4^-, and SeO_4^{3-} at 77 K. Data are given in tables and on graphs.

Rao, N.R., Ramanaiah, K.V., and Rao, S.M., 1967, A symmetrical scattering of light by some liquids: Proceedings of the 1st International Conference on Spectroscopy, Bombay, v. 1, p. 367-370.

Discussion on the almost symmetrical scattering of light by some liquids. The Raman spectra of sulfuric acid and water show structural differences between H_h, H_v, and V_h. These observations are accounted for by regions of short range ordering in the liquids.

Regnard, J.R., and Hocquenghem, J.C., 1971, [Moessbauer effect study of the Fe_3Se_4 semimetallic compound with ordered vacancies]: Journal De Physique, Colloque C1, v. 1, p. C1-268 - C1-270. In French.

Experimental study of the Moessbauer effect in the compound Fe_3Se_4. [Translation unavailable to authors. Data taken from Chem. Abs. 75:27058k, 1971.]

Ruedorff, W., Erfurth, H., and Kemmler-Sack, S., 1967, [Ternary oxides. VIII. Ternary Uranium (V) oxides with trivalent cations]: Zeitschrift fur Anorganische und Allgemeine Chemie, v. 354, no. 5-6, p. 273-286. In German.

Experimental study on the reflectance spectra of several ternary uranium (V) oxides with trivalent cations. [Translation unavailable to authors. Data taken from Chem. Abs. 68:18155t, 1968.]

Sahakari, M.P., and Mukhedkar, A.J., 1971, I.R. spectra and magnetic susceptibilities of uranyl complexes: Journal of Inorganic and Nuclear Chemistry, v. 33, no. 3, p. 888-892.

Experimental study on the i.r. spectra and magnetic susceptibilities of a series of organic complexes with UO_2^{2+}. Data are presented graphically and in a

table.

Sahoo, Balaram, and Satapathy, K.C., 1967, Infrared investigations on some uranium (IV) compounds: Proceedings of the Nuclear and Radiation Chemistry Symposium, 3rd, Poona, India, p. 469-472.

Experimental study on the infrared spectra of a number of uranium (IV) compounds. The absence of strong band in the metal-oxygen multiple bond region, 850-1060 cm^{-1}, was noted, suggesting the absence of the UO^{2+} ion. Data are presented in a table.

Saito, Shuji, 1970, Microwave spectrum of the SO radical in the first electronically excited state, ^{1}delta: The Journal of Chemical Physics, v. 53, no. 6, p. 2544-2545.

Experimental study on the rotational transition of the SO radical in the first electronically excited state. Data are presented graphically and in the text.

Sato, Kimitaka, Sudo, Tomoyoshi, Kurosawa, Fumio, and Kammori, Ohiko, 1969, [Effect of crystallinity on the infrared spectra of alpha- and gamma-ferric oxyhydroxides]: Nippon Kinzoku Gakkaishi, v. 33, no. 12, p. 1371-1376. In Japanese.

Experimental study on the relationship between aging and ir spectra of alpha-FeOOH, and gamma-FeOOH (the main components of iron ores and rusts.) [Translation unavailable to authors. Data taken from Chem. Abs. 72: 69728x, 1970.]

Schnepp, O., 1969, The spectra of molecular solids: Advances in Atomic and Molecular Physics, v. 5, p. 155-200.

Theoretical discussion of the lattice vibrational spectra and intramolecular vibrational spectra of molecular solids with a detailed discussion on the spectra of solid hydrogen. Equations and tables display pertinent information.

Schwarzmann, Einhard, and Sparr, Helut, 1969, [Hydrogen bridge bonds in hydroxides with diaspore structure]: Zhurnal Naturforsch B, v. 24, no. 1, p. 8-11. In German.

Experimental study on the ir and reflectance spectra of compounds having a diaspore structure (including alpha-FeO_2H). [Translation unavailable to authors. Data taken from Chem. Abs. 70:62585y, 1969.]

Seimsen, K.J., and Riccius, H.D., 1969, Multiphonon processes in amorphous selenium: Journal of Physics and Chemistry of Solids, v. 30, no. 7, p. 1897-1900.

Experimental study on the ir absorption spectra (20-2000 u) of amorphous selenium at 77 and 300 K with comparison to literature data. Data are presented in tables and two figures.

Sergushin, N.P., Nefedov, V.I., Rozanov, I.A., Slovyanskikh, V.K., and Gracheva, N.V., 1977, [X-ray electron studies of uranium sulfides, selenides, and tellurides.]: Zhurnal Neorganicheskoi Khimii, v. 22, no. 3, p. 856-858. In Russian.

Experimental study of the x-ray spectra of compounds of uranium with sulfur selenium and tellurium. [Translation unavailable to authors. Data taken from Chem. Abs. 86:148459c, 1977.]

Sevchenko, A.N., 1968, [Analysis and interpretation of electronic --vibrational spectra for uranyl compounds]: Izvestiia na Fizicheskii Instituts ANEB, Bulgarska Akademiia na Naukite, v. 17, p. 69-85. In Russian.

Theoretical discussion of the results of previous studies concerning the transitions between energy levels in the crystal lattice of uranyl compounds. [Translation unavailable to authors. Data taken from Chem. Abs. 69:81974v, 1968.]

Shokarev, M.M., Margulis, E.V., Vershinina, F.I., Beisekeeva, L.I., and Savchenko, L.A., 1972, [Infrared spectra of iron (III) hydroxide sulfates and hydroxides]: Zhurnal Neorganicheskoi Khimii, v. 17, no. 9, p. 2474-2479. In Russian.

Experimental study on the ir spectra of alpha- and gamma-FeOOH and $Fe(OH)SO_4$. [Translation unavailable to authors. Data taken from Chem. Abs. 78:50147j, 1973.]

Skotnikov, A.I., and Sverdlov, L.M., 1977, [Determination of the anharmonic potential function of the hydrogen selenide molecule from spectroscopic data (with allowance for Coriolis resonance) and calculation of the vibrational spectra of isotopically substituted hydrogen selenide (with allowance for Darling-Dennison resonnance)]: Optikai Spektroskopiia, v. 42, no. 1, p. 88-93. In Russian.

Theoretical study on the quartic potential function, force field, and vibrational spectra of the hydrogen selenide molecule. Theoretical calculations are compared with earlier experimental works in tabular format.

Solomon, J.E., Johnson, D.R., and Lin, C.C., 1968, Low-field Zeeman effect of the microwave spectrum of the SO radical:

Journal of Molecular Spectroscopy, v. 27, no. 1-4, p. 517-521.

Experimental study on the low-field Zeeman effect of some rotational transitions in the ground state of the SO radical in the region of 0-30 gauss. Data are presented in both tabular and graphical format.

Sorokin, O.M., and Blank, V.A., 1970, [Optical transmission and excitation of plasma oscillations in free films of Al, In, Sn, Mg, Ge, Se, and Te in the vacuum ultraviolet region of the spectrum]: Optikai Spektroskopiia, v. 28, no. 6, p. 1178-1185. In Russian.

Experimental study of the optical transparency of free layers of selenium and other elements in the 15-200 nm region. Data are given graphically and in a table.

Spender, M.R., Coey, J.M.D., and Morrish, A.H., 1972, The magnetic properties and Moessbauer spectra of synthetic samples of Fe_3S_4: Canadian Journal of Physics, v. 50, no. 19, p. 2313-2326.

Experimental study on the magnetic properties of synthetic Fe_3S_4 using Moessbauer effect spectrometry at various temperatures up to 296 K. Data are presented in tables and on graphs.

Stafsudd, O.M., 1967, The far infrared spectrum of several salts of quadravalent uranium: University of California, Los Angeles, Ph.D. Dissertation, 86 p.

Experimental study of the far infrared spectra of a number of quadravalent uranium salts over the wavelength range 25-500 cm^{-1} with a determination of the frequencies of the fundamental infrared active lattice modes. Data are presented both graphically and in tables.

Steele, T.W., Taylor, J.D., and Summerson, C.D., 1967, Determination of uranium by the TBP (tributyl phosphate) method: National Institute of Metallurgy Report NIM-92/14, 7 p.

Description of an analytical procedure for uranium involving the formation of a uranyl thiocyanate complex in the presence of EDTA. [Article unavailable to authors. Data taken from Chem. Abs. 71:95047j, 1969].

Steenbeckeliers, G., 1968, [Second order treatment of rotator. Microwave spectra of the sulfur dioxide molecule]: Annales de la Societe Scientifique de Bruxelles, Serie 1, v. 82, no. 3, p. 331-404. In French.

Experimental study on the microwave spectra of sulfur

dioxide in the 8-60 GHz range for the ground state and the vibrational excited states. [Translation unavailable to authors. Data taken from Chem. Abs. 71:8226q, 1969.]

Steger, E., Ciurea, I.C., and Fadini, A., 1967, [Infrared spectrum of sodium chlorosulfate and force constants for the ions $(SO_3Cl)^-$, $(SO_3F)^-$, and $(SO_3S)^{2-}$]: Zeitschrift fur Anorganische und Allgemeine Chemie, v. 350, no. 5-6, p. 225-230. In German.

Experimental study on the ir spectrum of $NaSO_3Cl$ with calculation of force constants for the ions SO_3Cl^-, SO_3F^-, and SO_3S^{2-}. [Translation unavailable to authors. Data taken from Chem. Abs. 66: 120302; 1967.]

Stillert, A.H., Renton, J.J., Montano, P.A., and Russell, P.E., 1978, Application of Moessbauer spectroscopy to monitor acid mine drainage potentials of coal seams: Fuel, v. 57, no. 7, p. 447-448.

Experimental study to determine the unaltered FeS_2 and $FeSO_4$ in acid mine drainage associated with coal seams using Moessbauer spectroscopy. Data are shown in graphs and in tables.

Stopperka, Klaus, 1969, [Infrared-spectroscopic studies on the sulfur trioxide-water and sulfur trioxide-deuterium oxide

liquid systems. IV. Infrared spectra and constitution of the deuterium oxide-deuterated sulfuric acid and deuterated sulfuric acid-sulfur trioxide liquid systems]: Zeitschrift fur Anorganische und Allgemeine Chemie, v. 370, no. 1-2, p. 80-90. In German.

Experimental study on the ir spectra of several deuterated species in the D_2O - D_2SO_4 system. [Translation unavailable to authors. Data taken from Chem. Abs. 72:7492g, 1969.]

Stopperka, Klaus, and Kilz, Friedhelm, 1969, [Infrared spectroscopic studies of the gas phase above the sulfur trioxide-water liquid system. II. Composition of the gas phase above the sulfuric acid - sulfur trioxide liquid system as a function of temperature]: Zeitschrift fur Anorganische und Allgemeine Chemie, v. 370, no. 1-2, p. 59-66. In German.

Experimental study on the ir absorption spectra of the gas phase in equilibrium with H_2SO_4 - SO_3 solution from 400 to 3600 cm^{-1} at various temperatures and concentrations of SO_3. [Translation unavailable to authors. Data taken from Chem. Abs. 72:7491f, 1969.]

Stopperka, Klaus, and Kilz, Friedhelm, 1969, [Infrared-spectroscopic studies of the gas phase above the sulfur

trioxide-water liquid system. I. Composition of the gas phase above the water-sulfuric acid liquid system as a function of temperature]: Zeitschrift fur Anorganische und Allgemeine Chemie, v. 370, no. 1-2, p. 49-58. In German.

Experimental study on the ir absorption spectra of gas phases over 78%-100% aqueous H_2SO_4 at 30°-250°C between 400 and 3600 cm^{-1}. [Translation unavailable to authors. Data taken from Chem. Abs. 72:7490e, 1970.]

Sugawara, Fuyuhiko, and Nakaura, Terutaro, 1970, Far-infrared reflectivity spectra of $NaH_3(SeO_3)_2$ crystal: Journal of the Physical Society of Japan, v. 29, no. 1, p. 162-163.

Experimental study of the far-infrared reflectivity spectra of $NaH_3(SeO_3)_2$ crystal from 16-400 cm^{-1} at room temperature and at 202 K. Data are presented graphically.

Teder, Ants, 1968, The spectra of green sulfide and polysulfide solutions: Svensk Papperstidning, v. 71, no. 11, p. 447-448.

Experimental study of the absorption spectra from 250 to 1000 mu of aqueous solutions of Na_2S, polysulfide

solutions, and sulfide solutions. The data are presented graphically.

Teder, Ants, 1968, The spectra of aqueous polysulfide solutions. I. The resolution into transition energy bands: Arkiv Foer Kemi, v. 30, no. 35, p. 379-391.

Experimental study of the spectra of polysulfide solutions of different alkalinities and with different ratios of polysulfide excess S to sulfide S at 25° and 80°C over the range 200 to 600 nm. Data are presented graphically and in a table.

Teder, Ants, 1969, Spectra of aqueous polysulfide solutions. II. Effect of alkalinity and stoichiometric composition at equilibrium: Arkiv Foer Kemi, v. 31, no. 17, p. 173-198.

Experimental study of the absorptivities, at 8 different wave numbers, of polysulfide solutions of varying alkalinities and varying stoichiometric composition. The equilibria in the polysulfide solutions were analyzed using the method of corresponding solutions. Data are shown graphically and in tables.

Thiel, R.C., 1970, On interstitials and vacancies in FeS: Physica Status Solidi, v. 40, no. 1, p. K17-K20.

Re-examination of previous work on the Moessbauer spectra of nearly stoichiometric FeS system for the presence of interstitial Fe. None was observed with X-ray analysis nor did the spectral lines for Fe become visible at higher temperatures.

Thomas, R.K., and Thompson, Sir Harold, 1969, The infrared spectrum and molecular structure of sulphur trioxide: Proceedings of the Royal Society of London, A., v. 314, p. 329-339.

Experimental study on the rotational fine structure of several bands of SO_3. Data are given in both graphical and tabular format.

Ti, S.S., Kettle, S.F.A., and Ra, O., 1976, Raman spectra of orthorhombic M_2SeO_4 (M = K, Rb, Cs) single crystals: Journal of Raman Spectroscopy, v. 5, p. 325-338.

Experimental study on the Raman spectra of alkali metal selenates in the region 0-1000 cm^{-1}. Data are given in tables and on graphs.

Torrie, B.H., 1973, Raman and infrared spectra of Na_2SeO_3, $NaHSeO_3$, H_2SeO_3, and $NaH_3(SeO_3)_2$: Canadian Journal of Physics, v. 51, no. 6, p. 610-615.

Experimental study on the Raman and infrared spectra of four selenite compounds as compared to the Raman spectra of SeO_3^{2-}, $HSeO_3^-$, and H_2SeO_3 obtained in a previous study. Data are presented in tables and on graphs.

Toyoda, Minour, Ogawa, Teiichiro, and Ishibashi, Nabuhiko, 1974, Emission spectra of carbon disulfide, hydrogen sulfide, and thiols by controlled electron impact: Bulletin of the Chemical Society of Japan, v. 47, no. 1, p. 95-98.

Experimental study on the emission spectra of the vapor phase of hydrogen sulfide, carbon disulfide, methanethiole, and ethanethiol in the 200-600 nm region. Data are presented graphically.

Treinin, Avner, and Wilf, J., 1970, Electronic spectra of the oxyanions of selenium in solution: The Journal of Physical Chemistry, v. 74, no. 23, p. 4131-4137.

Experimental study of environmental effects on the electronic spectra of SeO_3^{2-}, $HSeO_3^-$, SeO_4^{2-}. and $HSeO_4^-$. Some thermodynamic information is derived from the spectroscopic results. Data are given graphically and in tables.

Tsuji, Toshihide, Howe, A.T., and Greenwood, N.N., 1976, The Fe-Se system. I. Moessbauer spectra and electrical conductivity of $Fe_{1.04}Se$: Journal of Solid State Chemistry, v. 17, no. 1-2, p. 157-163.

Experimental study on the Moessbauer spectrum of $Fe_{1.04}Se$ as measured from 4.2 K up to the phase transition. Data are presented in graphs and in a table.

Tursi, A.J., and Nixon, E.R., 1970, Infrared spectra of matrix-isolated hydrogen sulfide in solid nitrogen: The Journal of Chemical Physics, v. 53, no. 2, p. 518-521.

Experimental study on the infrared spectra of H_2S in a series of solid nitrogen matrices at 20 K for the 2500-4000 cm^{-1} region. Data are presented graphically.

Tyurin, Yu. N., Zaporozhets, A.S., Pushkarev, V.V., and Agisheva, L.V., 1972, [Electronic absorption spectra of iron (III) sulfate in aqueous solutions]: Trudy Ural'skogo Lesotekhnicheskogo Instituta,, no. 28, p. 108-115. From Referativnyi Zhurnal, Khimiia, 1973, Abstract No. 3B152. In Russian.

Experimental study and interpretation of uv and visible absorption spectra of aqueous solutions of

$Fe_2(SO_4)_3$. [Translation unavailable to authors. Data taken from Chem. Abs. 79:25291q, 1973.]

Umreiko, D.S., and Larkin, G.N., 1968, [Oscillator model of the UO_2^{+2} group and fluorescence spectra of uranyl compounds]: Zhurnal Prikladnoi Spektroskopii, v. 8, no. 3, p. 447-452. In Russian.

Experimental study on the spectral lines corresponding to optical transitions on the energy level of totally symmetrical stretching vibrations of the UO_2^{+2}, 1968.]

Umreiko, D.S., Svchenko, A.N., and Novitskii, G.G., [Absorption spectra of the actinides and the electronic nature of chemical bond in the uranyl cation]: Doklady Akademiia Nauk Belorusskoi SSR, v. 12, no. 10, p. 884-887. In Russian.

Tabulation of electronic absorption spectra of actinide compounds with a discussion on the participation of 5f electrons in the UO_2^{2+} bond. [Translation unavailable to authors. Data taken from Chem. Abs. 70:42522x, 1969).]

Vdovenko, V.M., Mashirov, L.G., and Suglobov, D.N., 1969, [Valence vibrations of $[U^{16}O^{18}O]^{++}$ in uranyl

complexes]: Doklady Akademiia Nauk SSSR, v. 185, no. 4, p. 824-827. In Russian.

Experimental study on the ir spectra of 12 complexes of $[U^{16}O^{18}O]^{++}$ measured by the Nujol technique over the range 750-1000 cm^{-1}. [Translation unavailable to authors. Data taken from Chem. Abs. 71:43875x, 1969.]

Voight, E.M., Meyer, B., Morelle, A., and Smith, J.J., 1970, The spectrum of matrix isolated SeO_2: Evidence for slow internal conversion between excited states: Journal of Molecular Spectroscopy, v. 34, no. 2, p. 179-189.

Experimental study on the spectrum of matrix-isolated SeO_2 between 2200 and 6000 Å at 20 K. Data are listed in tables and on graphs.

Volkov, S.V., and Buryak, N.I., 1974, [Electronic absorption spectra and structure of Fe(II) complexes in sulfate-containing melts]: Teoreticheskaia Eksperimental-naya Khimii, v. 10, no. 4, p. 523-528. In Russian.

Experimental study of the electronic absorption spectra of Fe(II) complexes in molten salt media of NH_4HSO_4 and $KHSO_4$ were recorded in the range 13,000 to 3,000 cm^{-1} between 160° and 215°C. Data are also given for the electronic absorption spectrum of Fe(II) in a melt of

(Li_2, Na_2, K_2) SO_4 (eut) at 600°C. Experimental data are presented graphically.

Volod'ko, L.V., Sevchenko, A.N., and Umbriko, D.S., 1967, [Classifying the electronic states of uranyl compounds]: Doklady Akademii Nauk SSSR, v. 172, no. 6, p. 1303-1304. In Russian. English translation in Soviet Physics - Doklady, v. 12, no. 2, p. 153-154.

Theoretical discussion of the available data on the absorption spectra of crystalline uranyl compounds. Absorption lines in two regions are ascribed to various electron transitions.

Volod'ko, L.V., and Xuong, Le Thanh, 1969, [Effect of structural changes on the vibrational spectra of sulfates in aqueous solutions]: Zhurnal Prikladnoi Spektroskopii, v. 10, no. 5, p. 779-783. In Russian.

Experimental study on the Raman spectra of freshly prepared saturated solutions of several different sulfates (including UO_2SO_4). [Translation unavailable to authors. Data taken from Chem. Abs. 71:43869y, 1969)]

Walker, C.R., and Vita, O.A., 1970, The precise determination of uranium in impure uranyl nitrate and uranium oxides:

Analytica Chimica Acta, v. 49, no. 3, p. 391-400.

Description of an analytical technique for uranium with greater than a few tenths percent impurities. The technique is described in the text with graphical and tabular presentation of pertinent data.

Walker, T.E.H., 1973, The photodetachment spectra of diatomic hydride anions: Chemical Physics Letters, v. 19, no. 4, p. 493-496.

Theoretical discussion of the photodetachment spectra of several hydride anions measured previously using lasers. The spectra of OH^-, SH^-, and SeH^- are explained in terms of rotational line strengths. Calculated spectra are displayed in three figures.

Ward, A.T., 1968, Crystal-field splitting of fundamentals in the Raman spectrum of rhombic sulfur: The Journal of Physical Chemistry, v. 72, no. 2, p. 744-746.

Experimental study of the Raman spectrum of rhombic sulfur at room temperature. Several peaks were resolved into doublets. Data are presented graphically.

Ward, A.T., 1968, Raman spectroscopy of sulfur, sulfur-selenium, and sulfur-arsenic mixtures. The Journal of Physical

Chemistry, v. 72, no. 12, p. 4133-4139.

Experimental study on the molecular complexity of sulfur, sulfur selenium, and sulfur-arsenic mixtures in the crystalline, glassy, and liquid phases by Raman spectroscopy using a He-Ne laser as excitation source. The spectra are presented graphically.

Ward, A.T., 1969, Raman spectrum and force constants of S_4^{2-}: Materials Research Bulletin, v. 4, no. 8, p. 581-590.

Experimental study on a new species of molecular sulfur in concentrated solutions of Na_2S using Raman spectroscopy with He-Ne laser excitation. Data are presented in a table and in the text.

Watkins, I.W., 1969, Three electronic transitions of sulfur dioxide in the vacuum ultraviolet: Journal of Molecular Spectroscopy, v. 29, no. 3, p. 402-409.

Experimental study on the absorption spectrum of SO_2 in the vacuum ultraviolet from 1340-1190 Å. Electronic transitions composed of diffuse bands for which no K structure could be observed are vibrationally analyzed. Data are presented graphically and in a table.

Wieser, H., Krueger, P.J., Muller, E., and Hyne, J.B., 1969, Vibrational spectra and a force field for H_2S_3 and H_2S_4: Canadian Journal of Chemistry, v. 47, no. 10, p. 1633-1637.

Experimental study on the infrared and Raman spectra of H_2S_3 and H_2S_4 in CCl_4 and CS_2 solution with assignments as to conformation. Data are presented graphically and in tables.

Winnewisser, B.P., 1970, High resolution infrared spectrum of V1 and V5 of disulfane: Journal of Molecular Spectroscopy, v. 36, n. 3, p. 414-432.

Experimental study of the infrared absorption of HSSH between 2490 and 2650 cm^{-1} with analysis of the V5 and V1 bands and presentation of the resulting molecular constants. Data are presented graphically and in tables.

Winnewisser, B.P., and Winnewiser, Manfred, 1968, New measurements of the infrared spectrum of H_2S_2 and D_2S_2 and evaluation of the molecular force field: Zhurnal Naturforsch, v. 23, no. 6, p. 832-839.

Experimental study on the infrared spectrum of H_2S_2 and D_2S_2 in the range 4000 to 250 cm^{-1}. Data are presented both in graphical and tabular form.

Winnewisser, Gisbert, Winnewisser, Manfred, and Gordy, Walter, 1968, Millimeter-wave rotational spectrum of HSSH and DSSD. I. Q Branches: The Journal of Chemical Physics, v. 49, no. 8, p. 3465-3478.

Experimental study on the Q-branch rotational lines of H_2S_2 in the frequency range 80-200 Gc/sec and those of D_2S_2 in the range of 60-220 Gc/sec. Data are presented in numerous tables and diagrams.

Zarakhani, N.G., 1978, [Homogeneous catalytically active solutions. XI. Raman spectra of aqueous solutions of sulfuric acid at 15, 35, and 45°C]: Zhurnal Fizicheskoi Khimii, v. 52, no. 8, p. 1954-1956. In Russian.

Experimental study on the intensities of the Raman lines of aqueous sulfuric acid solutions at a variety of concentrations and temperatures. [Translation unavailable to authors. Data taken from Chem. Abs. 89:188302q, 1978.]

Zarakhani, N.G., Librovich, N.B., and Vinnik, M.I., 1971, [Homogeneous catalytically active solutions. VII. Equilibrium composition of a sulfuric acid-water system]: Zhurnal Fizicheskoi Khimii, v. 45, no. 7, p. 1733-1737. In Russian.

Experimental study on the relative intensities of Raman spectral lines in the H_2SO_4-H_2O system. [Translation unavailable to authors. Data taken from Chem. Abs. 75:1124622x, 1971.]

Zhetbaev, A.K., and Kaipov, D.K., 1968, [Parameters of Moessbauer spectra of iron sulfides]: Izvestiya Akademii Nauk Kazakhskoi SSR, Seriya Fiziko-Matematicheskaya, v. 6, no. 6, p. 78-84. In Russian.

Experimental study on the Moessbauer spectra of several natural mineral sulfides at 80-820 K. [Translation unavailable to authors. Data taken from Chem. Abs. 70:110328r, 1969.]

Zhetbaev, A.K., and Kaipov, D.K., 1968, [A symmetry of doublet components of Moessbauer absorption spectra in some powdery iron compounds]: Trudy Institut Yadernoi Fiziki, Akademiia Nauk Kazakhskoi SSR 1967, v. 7, p. 3-7. In Russian.

Experimental study on the asymmetry of certain doublet components in the Moessbauer absorption spectra of iron sulfates and sulfides. [Translation unavailable to authors. Data taken from Chem. Abs. 69: 63386A, 1968.]

Zuman, Petr, and Szafranski, Wayne, 1976, Ultraviolet spectra of hydroxide, alkoxide, and hydrogen sulfide anions: Analytical Chemistry, v. 48, no. 14, p. 2162-2163.

Experimental study on the ultraviolet spectra of hydroxide, alkoxide, and hydrogen sulfide anions below 230 nm. Both of the acid dissociation constants of hydrogen sulfide were determined. Data are given on graphs and in the text.

Zvereva, L.I., and Kononov, E. Ya., 1968, [Spectra of As VII and Se VIII in the vacuum ultraviolet region]: Optikai Spektroskopiia, v. 24, no. 5, p. 827-829. In Russian.

Experimental study on the vacuum uv spectra of As VII and Se VIII. [Translation unavailable to authors. Data taken from Chem. Abs. 69:31731t, 1968.]