

NEW LITERATURE CITATIONS FOR 1941-1945

1941

1743a. CAROBBI, G. AND PIERUCCINI, R.

On the Minor Constituents of Some Sedimentary Rocks of the Tuscan-Emilian Apennines.

Spectrochim. Acta, 2, 32-44 (1941).

Spectrochem. Abs., III, 1940-45 (1947).

Arc spectra from samples of limestone, shale, marl, and clay were recorded, using heavy currents (10-20 amp.) and the spectra were examined qualitatively. Tables of lines used in the identification of the elements are given, excluding lines which are interfered with. Besides the elements found chemically, those detected were Co, Ni, Ge, Cr, Ga, In, Cu, Zn, Ba, Sr, Ag, V, Nb, Ta, Zr, and Hf.

1744a. CASTILLO, E. B.

Results Obtained in a Qualitative Spectrum Analysis of Some Minerals of Aragon.

Trabajos lab. bioquím. y quím. aplicada, Inst. "Alonso Barba," Univ. Zaragoza, Facultad. Cienc. Sér. II, 2/3, 285-304 (1941).

C. A., 42, 8715h (1948).

Tabulation of lines identified in arc spectra of several minerals: Cu, a silicate, 2 samples of argentiferous Cu, and iron.

1784a. HAMMER, A.

Resolving Power, and the Resolution Given by Prism Spectrographs.

Spectrochim. Acta, 2, 107-130 (1941).

Spectrochem. Abs., III, 1940-45 (1947).

A theoretical investigation of the problems of prism spectrographs in which high dispersion is obtained by increasing the focal length of the instrument.

1786a. HARAI, K.

Spectrochemical Determination of Boric Oxide in Glass. IV.

J. Chem. Soc. Japan, 62, 933-4 (1941).

C. A., 41, 5271g (1947).

ZnO in glass lowers the intensity ratio of spectral lines, $\log (I_B/I_{Si})$ in proportion to the ZnO content (cf. *C. A.*, 35, 7667²; 41, 2867e).

1786b. HARAI, K.

Quantitative Spectrochemical Determination of Lead Oxide in Glass.

J. Chem. Soc. Japan, 62, 975-7 (1941).

C. A., 41, 2867f (1947).

The powd. sample of glass is placed in a hole at the tip of a Cu electrode. The spark

spectrum is photographed and the intensities of the line Pb I (2614.2 Å) and Si I (2631.3 Å) are compared. In 22 samples, $\log [PbO/SiO_2]$ was equal to the ratio of the intensity of the Pb line to that of the Si line to within 10%.

1786c. HARAI, K.

Spectrochemical Determination of Boric Oxide in Glass.

J. Chem. Soc. Japan, 62, 1183-4 (1941).

C. A., 41, 2867e (1947).

The effect of TiO_2 on the detn. of B_2O_3 was studied. The log of the ratio of the intensity of the 2496.8 Å line of B to the intensity of the 2506.9 Å line of Si decreases slightly with increase of $[TiO_2]/[SiO_2]$ (cf. *C. A.*, 35, 7667²).

1793a. HERRMANN, J. AND SEITH, W.

Spectrochemical Analysis of Impurities in Zinc.

Spectrochim. Acta, 1, 548-559 (1941).

Spectrochem. Abs., III, 1940-45 (1947).

Small traces of Sn, Pb, Bi, Tl, and Cd in zinc or zinc alloys are concentrated by dissolving the alloy in acid and slowly precipitating the impurities, with a little Ni as internal standard, on the surface of a pure Zn rod which is immersed in the solution for several hours. The impurities are precipitated on the metal by electrolysis, without external emf. Synthetic standard solutions are easily made for calibration purposes. Spectra are obtained from a spiral traverse of the Zn rod with a Pfeilsticker a.c. arc with high-frequency ignition; in a 15 sec. exposure 7 turns of the spiral are uniformly scanned. A chisel-ended Al rod is used as the stationary electrode. The lower limit for quantitative analysis of these 5 elements is about 0.001% and an accuracy of $\pm 10\%$ is claimed at 0.01%. Lower concentrations might also be tested by a modification of this method.

1875a. PASSER, M. AND LAUNENSTEIN, A.

The Determination of Plating-Thickness by Spectrochemical Analysis.

Metallwirts., 20, 209-215 (1941).

Spectrochem. Abs., III, 1940-45 (1947).

Two methods have given semiquantitative results. For Cr, Ni, Zn, on Fe; Cu on Zn; Cu on Al; a comparison between lines of the plating and of the base metal can be used if standard spectra are made by sparking on coatings of known thickness under identical conditions. For Cd and Ni on Fe results

were also obtained from a series of consecutive spectra on the same portion of the specimen; the time taken for lines of the base metal to reach some specific level of intensity is a sensitive function of the plating thickness.

1687a. RANKAMA, K.

On a New Method of Prospecting.

Geolog.-Rundschau., **32**, 575-578 (1941).

Spectrochem. Abs., **III**, 1940-45 (1947).

Outlines the application of the spectrographic analysis of plant ashes to the detection of mineral deposits in the subsoil. The precious metals, Sn, Sb, Pb, and Zn, and most of the metals used in alloy steels may be tested for in this way. Examples of the search for

Ni in Finland and of the complications introduced by glacial moraines are given.

1901a. SCHNELL, J.

Some Results with the "Schuhknecht-Waibel" Photoelectric Apparatus in the Determination of Potash and Phosphate.

Spectrochim. Acta, **2**, 71-80 (1941).

Spectrochem. Abs., **III**, 1940-45 (1947).

A nondispersing photoelectric apparatus using the light from a controlled oxy-acetylene flame into which a solution is fed is applied to the testing of minerals for their K concn. The same apparatus is adapted for absorptiometric estimation of P as phosphomolybdate.

1942

1873a. BARCELÓ MATUTANO, J. R.

Spectrographic Analysis of Ashes.

Rev. real acad. cienc. exact., fís. y nat. Madrid, **36**, 362-86 (1942).

C. A., **45**, 5071b (1951).

A review of quant. spectrographic methods. 115 references.

1990a. COHEUR, P.

On Spectrochemical Analysis—Method Using the Photometric Breadth of the Lines.

1942, Thesis, Univ. of Liège, pp. 1-159.

Spectrochem. Abs., **III**, 1940-45 (1947).

A more detailed account of the method described in Abs. No. 776 with its application to the estimation of Mn in Fe as well as of Mn in Al. Advantages claimed for this method are that a greater precision can be obtained than by the usual densitometric procedure and that a longer range of concentrations can be dealt with than is usual with a given pair of lines. The method depends on the selection of lines of suitable profile, measured with a microphotometer, and on using faint impurity lines. This can be done with a stepped wedge if necessary. Changes of photographic procedure or exposure time have no effect on the results, but the slit width and the dimensions of the light-source must be kept constant.

1990b. COHEUR, P.

Spectrum Analysis: The Method Using the Photometric Width of Lines.

Mem. soc. roy. sci. Liège [4] **5**, 387-545 (1942).

C. A., **42**, 7195f (1948).

The method of quant. spectrochem. analysis proposed by Gerlach and Rollwagen (*C. A.*, **32**, 521) for detg. small amts. of impurities in metals and alloys has been developed and tested and found to surpass other methods in both speed and accuracy. It consists of measuring the width of the profile of a selected standard line of the metal at the

summit of the profile of a nearby impurity line on microphotometer tracings of the test spectrograms. The correlation, $b = f(\log c)$, between width of standard line and height of impurity line is based on the assumption that the height of the impurity line is proportional to the concn. of the impurity in the metal. In selecting a pair of lines for measurement it is desirable to choose an impurity line that is not too strong and a standard line of rather large phys. width so that its actual width is affected only a little or not at all by instrumental factors. If no impurity line sufficiently weak can be chosen, available lines may be weakened by placing a neutral filter over half the spectrograph slit. An illustration of the procedure is given in the detn. of Mn in Al, a case in which the standard lines are naturally wide. A different type of problem is the detn. of Mn in steel, the lines of Fe being numerous and physically narrow. But the widths of the profiles of the standard lines again yield higher accuracies than can be detd. from the relative blackening of the lines. In problems involving 10 or 15% concns. of impurities in a metal, the profiles of the impurity lines may rise higher than those of the standards, in which case the inverse correlation of impurity line vs. height of standard line is found to be as accurate as the direct correlation. The new method is independent of the photographic factors involved in the test, such as development, exposure, and variations in sensitivity of the emulsions; for weak exposures and overexposures it can make use of the toe and shoulder of the H and D curves.

1990c. COHEUR, P.

Spectrum Analysis: Changes in Spark Spectra as a Function of Time (Abfunkfekt). Measurement of Temperatures.

Mem. soc. roy. sci. Liège [4] **5**, 365-85 (1942).

C. A., **42**, 7196f (1948).

A formula is given from which the temps. in a luminous source, say an arc or spark be-

tween metallic electrodes, can be detd. from the difference in blackening produced in at. and mol. lines on spectrograms of different exposures. Applied to the ^{32}S - ^{32}P and ^{32}D - ^{32}P lines of Al I and to some rotation lines in AlO bands, under conditions of const. and variable exposures, the results show that the temps. in the source have not varied sensibly and cannot be the cause of the "Abfunkeffekt" or the change in intensity exhibited by some lines during the exposures.

2002a. FRONDEL, O., NEWHOUSE, W. H., AND JARRELL, R. F.

Spatial Distribution of Minor Elements in Single Crystals.

Am. Mineralogist, 27, 726-746 (1942).

Spectrochem. Abs., III, 1940-45 (1947).

A grating spectrograph and carbon arc spectra of samples from various zones of crystals mixed with carbon powder were applied to exploring crystals of galena, calcite, and other minerals. Segregation of impurities such as Ag in galena, and Fe and Cu in calcite was detected and some quantitative results of moderate precision are quoted. A lower electrode of drilled carbon and upper of graphite were used, and the internal standard method with plate calibration from an Fe arc for a number of wavelengths. Faint Pb lines were compared with impurity lines of widely different wavelengths after converting the impurity line densities to relative intensities.

2003a. GATTERER, A.

The Excitation of Pure Band Spectra from Flaming Carbons.

Ricerche Spettroscopiche, 1, 153-179 (1942).

Spectrochem. Abs., III, 1940-45 (1947).

When a heavy current (200-350 amp.) is passed through a carbon rod to volatilize the impurities, a flame is emitted above the carbon in which the impurities show their spectra with certain limitations. If mirrors and lenses are used to image this flame on the spectrograph slit, with the image of the carbon rod near and parallel to the slit, spectra can be recorded from solutions placed on the carbon rod and in many cases the pure band spectra of simple salts can be obtained remarkably free from lines. Spectra of rare earth oxides, SrO and SrCl_2 , are illustrated together with arc spectra from the same materials.

2025a. KURODA, K.

Determination of Traces of Silver in Mineral Waters by the Dithizone Method.

Bull. Chem. Soc. Japan, 17, 419-23 (1942).
C. A., 41, 4595b (1947).

Volumetric detn. of Ag in the presence of Fe was studied. It was found that if Fischer's dithizone method is applied after removing Fe by NH_4OH and $(\text{NH}_4)_2\text{CO}_3$ soln., Ag can be detd. down to 5 γ per l. Eleven mineral springs in Japan were tested by this method. The presence of Ag was detected only in the hot springs of Sukayu. The values were 12-15 γ per l. Arc spectrographic detn. of Ag was also studied. The intensity change of spectral lines of Ag with Ag content was qualitatively detd. by prepg. Ag solns. of various concns. This spectrographic method gave 10 γ per l. as the Ag content of Sukayu.

2050a. PASTORE, S.

Material Economy in the Technical Production Analytical Laboratory.

Ricerca sci., 13, 58 (1942).

C. A., 43, 6103g (1949).

A brief discussion of the advantages of spectro-analysis with particular reference to Sn, Cu, Pb, Ni, Zn, and Mn.

2053a. PIERUCCINI, R.

Minerals of Copper Ores of Calabona, Italy.

Atti soc. toscana sci. nat., 51, 103-15 (1942).

C. A., 43, 6949b (1949).

Cuprite (Cu_2O 99.97, SiO_2 0.002, Fe_2O_3 0.002, Al_2O_3 0.002, MnO traces, Sb_2O_3 , PbO, TiO_2 , and I spectrographic traces) and native Cu were identified in the ores together with malachite, $\text{Fe}(\text{OH})_3$, alunite, kaolinite, and quartz. The formation process from the original minerals pyrite and chalcopyrite, because of oxidation-reduction phenomena, is described.

2075a. THEISSING, H. AND GOEBERT, M.

Spectral Sensitivity of Photographic Emulsions.

Z. Techn. Phys., 23, 130-139 (1942).

Spectrochem. Abs., III, 1940-45 (1947).

A double monochromator is provided with neutral filters in the range 3000 to 10,000 Å and a metal-filament lamp. A bolometer is used to measure the energy-distribution of the radiation, and an automatic exposure device can be used to make ten graduated exposures on the plate through wedges at sixteen wavelengths. Methods of calibration and calculation and a few typical results are given.

1943

2102a. BRITISH ALUMINIUM CO. LTD.

Analysis of Aluminium and Its Alloys.

Spectrochemical and Polarographic Analysis of Aluminium and Its Alloys.

British Aluminium Co., Ltd., 84 pp. (1943).

A revised description of spectrographic methods that appeared in "Analysis of Aluminium and Its Alloys" in 1941. The new material includes measurement of relative intensities with plate calibration, several

types of graphical calculators, and extension of analytical methods.

2104a. CAROBBI, G. AND PIERUCCINI, R.

Spectrographic Copper Determinations in Some Sedimentary Rocks of the Tuscan and Emilian Apennines.

Atti reale accad. Italia, Mem. classe sci. fis., mat. e nat., 14, 161-72 (1943); cf. *C.A.*, 36, 5737⁴.

C. A., 43, 978g (1949).

Cu was detd. in sedimentary rocks by a spectrographic method by using the Fe line 3271.00 and the Cu line 3273.96 as homologous lines. The results indicate a min. Cu content in limestone and a max. content in clays. The distribution of Cu in sedimentary rocks is a function of the amt. of clay present in the mineral and of the absorption capacity of the clay.

2104b. CHANG, T. C.

Chemical Studies on Chinese Fluorites. I. Rare Earths in Some Fluorites.

J. Shanghai Sci. Inst. [N.S.], 2, 115-55 (1943).

C. A., 41, 2351f (1947).

A survey of the rare earths in fluorite is given, and the results are shown in a large table giving locality, color, rare earth content, and method of analysis. Four specimens from China were analyzed chemically and spectrographically; Y and Yb were present in all, and in one sample from Lenchuikang there was 0.01% of rare earth, Y, Yb, Gd, Er, Ce, Sm, Dy, Nd, and La.

2128a. HAMMER, K. AND HAMMER, A.

Electric Control of Alternating Current Discharges in Arc or Spark Spectrum Analyses.

Patent: Ger. 741,440, Sept. 23, 1943.

2129a. HARADA, Y.

Chemical Studies of the Ocean. XVI. Spectrographic Sensitivity of the Cathode Layer in Cesium Analysis.

J. Chem. Soc. Japan, 64, 976-80 (1943).

C. A., 41, 3394f (1947).

By spectroscopic measurement of the line of 4593.2 Å as little as 26 γ of Cs can be detd.

2129b. HARADA, Y.

Chemical Studies of the Ocean. XVII. Determination of Cesium in Sea Water and in Bittern.

J. Chem. Soc. Japan, 64, 1049-53 (1943).

C. A., 41, 3394g (1947).

By adding NaClO₄ to bittern, Cs is pptd. The ppt. is filtered off and dissolved in hot water. Then Na₂Co(NO₂)₆ is added and Cs is pptd. The ppt. is ignited and Cs is extd. with hot water. Cs is concd. from this soln. by fractional crystn. The concd. soln. is

placed on the carbon electrode and the quantity of Cs is detd. by the photometry of the arc. The results: Cs content is 50-300 γ per l. in bittern or 2-10 γ per l. in sea water.

2140a. ISHITSUKA, H.

Quantitative Spectral Analysis of Platinum Wire.

J. Soc. Chem. Ind. Japan, 46, 258-63 (1943).

C. A., 42, 6267h (1948).

Quant. spectrum analysis was used to det. traces of Au and Pd in very pure Pt wire. Samples of Pt contg. 0.00014-0.058% Au and those contg. 0.0001-0.05% Pd were prepd. and analyzed by means of a microphotometric study of the spectrographic photographs of the arc produced between C electrodes in one of which a short piece of test Pt wire was inlaid. The curves of ratios of intensities of some line pairs of Pt-Au or Pt-Pd plotted against percentage of Au and Pd in Pt, both in logarithmic scale, were linear up to 0.01%, and applicable in the analyses of unknown samples.

2144a. KANATANI, M., MURAKAMI, S., AND OGAWA, E.

Distribution of Metallic Elements in the Residue of Zinc Smelting and Leaching and Their Extraction. I.

Bull. Inst. Phys. Chem. Research (Tokyo), 22, 775-80 (1943).

C. A., 42, 80h (1948).

In the residue of Zn smelting and leaching from the smoke and drain concentrate of Cottrell precipitator, drain concentrate of mist Cottrell precipitator, Cd and In sponges (from smoke and Zn dust), Pb-refining furnace, and recovery steps of Cd and In, the following rare metals listed in the order of Group VIII-I, besides the common elements Zn, Pb, Fe, Sb, Cd, Cu, Bi, Hg, and Ti were found spectroscopically: Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Re, Mo, W, V, Cr, Ta, Zr, Hf, Th, Y, La, Ce, Pr, Nd, Sm, Be, Gd, Se, Ge, Ga, In, Tl, Ag, and Au. The content of some of them was high enough to be worth extg. as follows: The rare-earth metals are fairly widely distributed in the residue, particularly in ZnSO₄ to the amt. of 10⁻⁴ of Zn, and were easily pptd. as polytungstate with Na₂WO₄. The Ge content was estd. at 10⁻⁴-10⁻⁵, but no simple extn. method could be found. Re was found in the residue of smelting and in Zn dust after bleaching, and the Re content in the residue of Zn dust after H₂SO₄ treatment was 1.6 × 10⁻⁵ and could be extd. with H₂O (yield 18%). The above acidified residue also contained 2.85 × 10⁻³ Ni which was extd. with alk. (satd. with NH₄OH)(NH₄)₂SO₄ by heating 3 hr. at 100° (yield 84.5%). The residue insol. in H₂SO₄ contained 10-30% Pb, e. g., the above residue contained 37.05% Pb, which was extd. with NaCl satd. with HCl (yield 95%).

- 2144b.** KILLIUS, E.
Wiring Arrangement for Spectrum Analysis.
Patent: Ger. 741,126, Sept. 16, 1943.
- 2146a.** KOBAYASHI, S.
Practical Application of Spectrum Analysis to Iron and Steel.
J. Soc. Chem. Ind. Japan, **46**, 244-7 (1943).
C. A., **42**, 6266f (1948).
In the analysis of Fe and steel, an element having an at. no. greatly different from that of Fe is likely to cause deviations due to the shape of the electrodes and the conditions of elec. discharge. Some elements, especially Mo, are likely to excite or suppress the lines of other coexistent elements. The method is useful for detg. the quality of material during the working and to study the compn. of molten steel.
- 2146b.** LANDERGRÉN, S.
The Application of Optical Spectrum Analysis to Geochemistry.
Iva, **1943**, 200-7.
C. A., **41**, 1963g (1947).
A review is given of some of the methods of optical spectrographic analysis, as applied to geochem. investigations. The value of spectrochem. methods in the detn. of amt. of elements of less than 1% is emphasized. The growing significance of the intermittent arc as a method of excitation is pointed out. Attention is called to the importance of using standard mixts. similar to the samples to be analyzed in order to maintain good reproducibility of the results.
- 2150a.** LUNDEGÅRDH, H.
The Requirements for Quantitative Spectrochemical Analysis.
Iva, **1943**, 189-200.
C. A., **41**, 1946g (1947).
A review of the technique used by L. with special reference to flame spectra.
- 2152a.** MATSUBARA, T.
Quantitative Spectrum Analysis.
J. Soc. Chem. Ind. Japan, **46**, 253-8 (1943).
C. A., **42**, 6251g (1948).
A review.
- 2170b.** OKUNO, G. AND SAWADA, T.
Quantitative Spectrum Analysis Under Various Excitation Conditions.
J. Soc. Chem. Ind. Japan, **46**, 241-4 (1943).
C. A., **42**, 6261e (1948).
The influence of varying self-inductance, secondary voltage, distance of spark gap, etc., of Feussner's spark generator on the results of quant. spectrum analysis was studied by using electrodes of Al contg. 0.02-0.3% Cu and 3247.54 Å (Cu I) and 3050.30 Å (Al II) as lines of reference for measuring the ratio ϕ of intensities of two elements and 2652.48 Å (Al I) and 2631.55 Å (Al II) as ratio f of intensities of two lines of Al. The correlation curve of Levy (*C. A.*, **34**, 5776⁷) coincides in cases when changes in elec. conditions such as self-inductance and voltage are considered, but differs when the changes in the distance of spark gap, amt. of cutting off both ends of spark by an interposing slit, etc., are considered.
- 2170c.** OTO, Y.
Quantitative Spectrum Analysis of Aluminum Alloys.
J. Soc. Chem. Ind. Japan, **46**, 247-52 (1943).
C. A., **42**, 6271a (1948).
Conditions for obtaining good results in the application of spectrum analysis to Al alloys were studied. It was found that the electrode should be made in the shape of a cylinder of 8 mm. diam. tapered to 3.5 mm. diam. and 10 mm. long. The spark gap should be 2.5 mm., the time of preliminary discharge 7 min.
- 2181a.** RODOLICO, F.
The Minor Constituents of Some Volcanic Rocks of Central Italy.
Periodico mineral. (Rome), **14**, 99-132 (1943).
Mineralog. Abstracts, **9**, 160 (1945).
C. A., **42**, 4102b (1948).
Spectrographic detns. of Ba, Be, Co, Cr, Cu, Mn, Ni, P, Pb, Sr, Ti, V, and Zr are given for 20 feldspathic and feldspathoidal rocks, for which chem. analyses for the main constituents are also given.
- 2186a.** SCARCELLA, M. AND ZUFFO, M. C.
Spectrochemical Analyses of Some Segregations Containing Chromium in Ophiolitic Rocks of Tuscany.
Atti soc. Toscana sci. nat. Pisa, Proc. verbali, **52**, 40-5 (1943).
C. A., **44**, 9858f (1950).
In the chromoprotite of Montignoso and in the Fe-Cr-Ti rich sand of Castiglione, besides Al, Fe, Cr, Mg, and Ti the presence of Cu, Ni, Co, and V was found spectrochemically. In the chromoprotite Ta, W, and Pt may be present too.
- 2203a.** SOMIYA, T., KAMMORI, O., AND HURUYA, M.
Sparkling Apparatus for Quantitative Spectrum Analysis.
J. Soc. Chem. Ind. Japan, **46**, 263-4 (1943).
C. A., **43**, 1616c (1949).
A way is described of setting up a sparking app. for quant. spectrum analysis which is not expensive but is easily constructed and equal in value for lab. use to Feussner's app.

2206b. TOBERT, S.

Spectrochemical Analysis in the Metal Industry.

Iva, 1943, 208-17.

C. A., 41, 1945h (1947).

A review.

2211a. WALTJ, R.

On the Solution Method of Quantitative Spectrographic Analysis; with an Appendix on the Solubility of Silicon in Aluminium.

Thesis: Eidg. Techn. Hochschule, Zurich, 1943.

Spectrochem. Abs., III, 1940-45 (1947).

This is a spark method in which solutions of the metal in HCl are fed to a hollow lower carbon electrode at about 20 ml./min. and allowed to overflow, while a spark passes between the surface of the solution and an upper carbon electrode. A small quartz

spectrograph is used and the method is calibrated from standard synthetic solutions taking advantage of the constancy of the slope of the calibration line of line density difference vs. log percentage concentration if the development is uniform. Once the slope values have been obtained for pairs of lines in mixtures containing known other elements, only one standard solution need be recorded on each plate to fix the calibration line for that plate. Tables of the slope of calibration lines for Mg, Mn, Fe, Cu, and Si in various alloys are given, and the effect of one element on another is studied and tabulated for additions of Mn, Mg, Fe, and Cu to pure Al. Two spectrum lines are used for each element and then averaged. By a modification of the solutions the method is applicable to Si up to 13% with accuracy comparable to that of chemical analysis, and it has been applied to checking the solubility of Si in Al at various temperatures.

1944

2216b. ANTHEUNISSENS, F. F.

On a Rapid Method for the Spectrographic Analysis of Pure Aluminium and Its Alloys.

Metallwirtschaft, 23, 327-9 (1944).

Spectrochem. Abs., III, 1940-45 (1947).

For the routine spark analysis with a controlled spark (Feussner type) with high self-inductance the pre-exposure sparking time can be reduced from 150 to 10 sec. if care is taken to use arc lines rather than spark lines in the comparisons. Cylindrical electrodes 6 mm. in diam. are used and the alloys of Al with Mn and Cu or with Mg and Si can be tested in the same way, obtaining a precision such that the C.V. of the results ranges from 3 to 6%. A diagram of the line-intensity relationships with various pre-exposure sparking times is given for Mn, Si, and Cu, and it is stated that the calibration lines are steeper when the pre-exposure sparking time is shortened. The lines used for Fe, Si, Mn, Mg, Cu, Zn, and Ti are listed.

2216c. ANTHEUNISSENS, F. F.

Arc-Spectrum Analysis of Brass.

Metallwirtschaft, 23, 329-32 (1944).

C. A., 42, 4094e (1948).

From measurements of the axial line intensities of Cu 2824 and Zn 2800 Å across arcs of various lengths, and of the variation of current strength and arc length with voltage for various electrode combinations (Ayrton curves), it is concluded that for the most accurate detn. of the principal and subsidiary elements in brass the sample should be converted into oxides and used in the pos. pole with a graphite anti-cathode, a voltage of approx. 40 v., and a current of approx. 1 amp. Al, As, Fe, Mn, Ni, Pb, and Zn can be

detd. to $\pm 5\%$, and 0.001% of Fe or 0.01% of Sn and As can be detected.

2217b. BARBANTI-SILVA, L. AND LIGABUE, L.

Normal and Anomalous Inhibitions in Various Types of Spectroscopic Sources.

Atti soc. nat. e mat. Modena, 75, 106-17 (1944).

C. A., 43, 7337i (1949).

Photographs are presented of arc spectra obtained by injecting solns. of varying comps. into 4 different kinds of arcs. The solns. vary from 10% $MgCl_2$ and 90% NaCl to 90% $MgCl_2$ and 10% NaCl. Results are explained by distinguishing between the solid and the gaseous parts of the source. The degree of excitation (and therefore the inhibition) varies greatly depending on whether the spectra come from substances in the solid or in the gaseous part. In arcs for which the gaseous part behaves as a source at low excitation, the solid part behaves as a source at high excitation and vice versa, depending on whether the excitation is of purely thermal origin or thermal and elec.

2242a. BECKHOUT, J.

Spectral Analysis of Electric Furnace Slags.

Med. K. Vlaam. Acad. Wetensch. Lett.

Schoone Kunst. Belg., 1944, 6, 5-17.

Spectrochem. Abs., III, 1940-45 (1947).

Powdered slags mixed with nine times their weight of CuO were burnt in the arc (1.2 amp.) and the spectra recorded through a stepped sector. Fe, Mn, Cr, and Mg in dolomite slags could be estimated with an accuracy of about 5%; Si and Al 8% over short ranges of concentration, and Ca, between 20 and 60% of the slag, only with an accuracy of

about 10% measured as the coefficient of variation of the average result from four spectra. In lime slags again Si could not be estimated below 1% of SiO_2 and the precision was in general similar to that for dolomite slags. A spectroscopic comparison of the Si, Fe, Al, and Mn in three samples of magnesite from different sources gave results which agreed well with the chemical figures. Maximum difference was 6% on the Fe_2O_3 content.

2246a. FUJITA, A.

Chemical Studies of Charred Animals. I. *J. Pharm. Soc. Japan*, **64**, 263-9 (1944).
C. A., **45**, 819h (1951).

Samples were taken from the parts not touching the carbonization vessel. To detect effectively minute amts. of elements in a large amt. of phosphate ordinary chem. analysis is ineffectual, and a method was recently devised by which phosphates could be removed. Spectral analysis was made by comparison with standards.

2252a. GRIGOROVICO, R. AND MAVRODINE-ANU, R.

Quantitative Spectral Analysis. I. Determination of Sodium, Calcium, and Strontium by Subjective Spectrophotometry.

Bull. soc. roumaine phys., **45**, No. 82, 33-56 (1944) (in German).
C. A., **43**, 6940h (1949).

The analyses are made by blowing the powd. compds. into an C_2H_2 flame with a current of air. The spectrophotometer uses as a standard a lamp with a Pt ribbon, upon which the light from the flame is focussed. The two sources together are then focussed upon the slit of a spectrophotometer. The intensity of the light from the flame is varied by two polarizing filters. Spectrophotometric detns. are then made by using both the characteristic lines in the flame spectrum and the continuous spectrum from the Pt ribbon lamp. The precision of the method is about 2%. The sensitivities obtained were for Na, Ca, and Sr: 0.15, 2.0, and 4.0 $\gamma/\text{cc.}$ resp.

2252b. GRIGOROVICO, R. AND MAVRODINE-ANU, R.

Quantitative Spectral Analysis. II. Visual Photometric Determination of Sodium, Calcium, and Strontium with the Help of Optical Filters.

Bull. soc. roumaine phys., **45**, No. 82, 57-67 (1944) (in German).
C. A., **43**, 6940i (1949).

Radiations of Na, Ca, and Sr could be isolated from each other with the help of colored optical glass filters (made by Schott-Jena). The flame spectrum was analyzed with a Pulfrich spectrophotometer. The precision was about 2% and sensitivities for Na,

Ca, and Sr were 1, 15, and 6 $\gamma/\text{cc.}$, resp. The advantage of the method is the simplicity of the detn.

2266a. HULDT, L.

Intensity Anomalies in the Flame Spectrum of Strontium on the Addition of Calcium. *Arkiv. Mat., Astron. Fysik*, **B31**, No. 1, 4 pp. (1944) (in English).
C. A., **41**, 2330h (1947).

The emission from metal atoms excited in a light source used for spectrochem. analysis is, in general, more or less influenced by other atoms present in the source. This investigation deals with the influence of Ca on lines emitted by Sr in the air-acetylene flame photographed with a quartz spectrograph. The Ca and Sr were dissolved in the form of chlorides. The concn. of Sr was varied between 0.2×10^{-4} and 0.01 mol. Exposures were made with Sr solns. without Ca and with up to 0.1 mol. CaCl_2 . The lines measured by photographic photometry were 4607 Å of Sr I and 4078 Å of Sr II. The influence of the added Ca is expressed by the ratio of the Sr concn. which without Ca would give the d. observed to the actual conc. With increasing amts. of Ca an intensification of the neutral line and a weakening of the ion line was observed.

2276b. KVALHEIM, A.

Quantitative Spectrographic Analysis in the Electric Arc.

Fra Fysikkens Verden, **1944**, 161-80.
C. A., **41**, 1945h (1947).

An account is given of quant. spectrochem. analysis in the cathode layer of the d.-c. carbon arc and in the intermittent arc.

2282a. LOPEZ DE AZCONA, J. M.

Analisis espectroquímico cuantitativo por emisión.

Madrid: Domicilio de la Academia. 1944.
C. A., **41**, 6496b (1947).

Reviewed in *Afinidad*, **22**, 239 (1945).

2282b. LOPEZ DE AZCONA, J. M. AND SANCHEZ SERRANO, E.

Spectrochemical Study of Cinnabars.

Anales ffs. y quim. (Madrid), **40**, 379-89 (1944).
C. A., **44**, 489i (1950).

Sixty-seven samples of cinnabar were studied spectrochemically by vaporizing completely 0.05 g. sample in a C arc and evaluating the resulting spectrograms by comparison with those of the pure elements. The following results are of a statistical nature: 32 elements, mostly belonging to the B families of groups I, II, IV, and V in periods 4, 5, and 6, were found as impurities. Among these, 12 elements were the most prevalent: Cu, Fe, As, Mg, Pb, Al, Ti, Ag, Mn, Ca, Sb,

and Si (in order of decreasing frequency). All the elements in the fourth period except Sc and Ga, both in the third group, were found. Certain elements appeared only in conjunction with other impurities: Ba with Mg, W with Mo, Bi with As and Sb, Zr with Ti.

2289a. NICHOLS, M. L. AND ROGERS, L. H.
Determination of Small Amounts of Molybdenum in Plants and Soils.

Ind. Eng. Chem. (Anal. Ed.), **16**, 137-140 (1944).

Spectrochem. Abs., **III**, 1940-45 (1947).

Arc spectra of powdered plant ash or soils placed in the crater of graphite electrodes were used and Mo was estimated by microphotometric comparison of Mo 3170 with Be 3131 from Be added as internal standard. The range covered is 0.001-0.1% of the ash, and results are compared with those obtained colorimetrically and chemically. All three methods are described in full.

2292a. ORTEL, A. C. AND PRESCOTT, J. A.
A Spectrochemical Examination of Some Ironstone Gravels from Australian Soils.
Trans. Roy. Soc. S. Australia, **68**, 173-6 (1944).

C. A., **42**, 4504e (1948).

Ten samples from Western and South Australia previously analyzed for major constituents were examd. spectrochemically, and the proportions of 14 elements in these gravels detd. in their HCl exts. Several soils assocd. with the gravels were also studied. Co, Cu, Mn, and Ni are probably not concd. with the iron, but Ga, Mo, Pb, V, and Zn appear to be; Cr is intermediate. Evidence points to the abs. concn. of Mo in the gravels as well as twofold concn. relative to the iron. A table of quant. data is included.

2293a. RANKAMA, K.

On the Geochemistry of Tantalum.

Bull. de la Comm. Géol. de Finlande, No. 133 (1944).

Spectrochem. Abs., **III**, 1940-45 (1947).

A short note on the difficulty of detecting traces of Ta spectrographically is included. The line 6450.36 was found insensitive to 1% in minerals even in the presence of 50% NaCl. X-ray spectrographic methods were used after preconcentration.

2295b. ROMLEHNER, L.

Experiences with the Flame Photometer of Schuhknecht-Waibel.

Mezőgazdasági Kutatások, **17**, 51-7 (1944).
C. A., **41**, 7165i (1947).

Practical advice is given. The mirror galvanometer must be used for detns. of K in soil solns.; a less sensitive galvanometer does not give reliable values. Voltages

higher than 40-50 should not be used, and the values must be graphically magnified to obtain exact results.

2298a. SCHAIRER, E.

Spectrographic Elementary Analyses of Human Concretions, Especially Gallstones from Different Countries and Periods.

Arch. path. Anat. Physiol. (Virchow's), **312**, 534-46 (1944).

C. A., **41**, 5953g (1947).

Spectrographic studies were made on 271 gallstones, 30 kidney stones, and some other concretions of the human body. Considerable differences in the elementary compn. were not noted in gallstones from many different regions and countries or in gallstones from Jena obtained between 1870 and 1940. The differences found were for the most part quant. in the sense that stones rich in pigment were also rich in the elements and conversely. The elementary compns. of the other concretions (kidney stones, salivary stones, pancreatic stones, bronchial stones, phlebolites, fecal concretions) were also very similar. It may be a question of pptn. of elements already circulating physiologically in the body, which at least in part also have important functions to fulfill (trace elements). Pb, Ag, Al, Sr, Si, B, and Cd were found frequently in addn. to the well-known trace elements Fe, Mn, Cu and Zn; Sn, Bi, Cr, Hg, As, and Ba also occurred occasionally.

2298b. SCHÜLER, H.

The Application of Emission Spectroscopy to the Study of Intramolecular Phenomena in Polyatomic Molecules.

Die Chemie, **57**, 134-5 (1944).

C. A., **40**, 6991f (1946).

Emission spectroscopy provides addnl. data to those obtained from absorption spectroscopy for the study of intramol. phenomena in polyat. mols. By the two forms of excitation, light excitation giving absorption spectra and electron-impact excitation giving emission spectra, the electrons are often differently influenced. The energy mechanism within the mol. is more complex than is indicated by absorption spectra alone. In polyat. mols. where a natural decompn. of the mols. occurs, one of the mol. fractions often remains in an excited state and emits a spectrum unique to the species. Thus emission spectra are important because they yield information on short-life mol. configurations which cannot be chemically detd.

2298c. SCHÜLER, H. AND SAUTER, E.

The Spectroscopic Determination of Small Amounts of Water.

Reichsber. Physik (Beihefte Physik. Z.), **1**, 40-2 (1944).

C. A., **41**, 6171f (1947).

By means of a special discharge tube OH bands at 3064 Å can be used to det. $\frac{1}{2}$ mg. H₂O in a carrier gas.

2309a. SZÉKI, P.

Spectrographic Determination of Magnesium in Silumins.

Bányász. Kohász. Lapok, 77, 303-10 (1944).
C. A., 41, 7302i (1947).

A "Qu 24" Zeiss spectrograph was used. The prepn. of samples and the designing of curves for calcn. of results are discussed in detail. 29 references.

2311a. VAN PER, P.

Spectrochemical Analysis of Metals and Alloys.

Techn.-Wet. Tijdschr., No. 3, 8 pp. (1944).
Spectrochem. Abs., III, 1940-45 (1947).

A review based on continental practice.

2312a. VÁRALLYAY, G.

Flame-Photometric Determinations of Potassium According to Nehring, Schachtschabel, and Riehm.

Mezőgazdasági Kutatások, 17, 95-104 (1944).
C. A., 41, 7602f (1947).

The methods of Nehring and Schachtschabel (*C. A.*, 31, 4437^a) give simply and quickly the K contents of soils and seem also to be suitable for detg. the effects of K fertilization on K contents. Ca, Mg, and Na do not interfere if present in not too high amounts; if necessary, the addn. of primary or secondary NH₄ phosphate prevents their interference. *Aspergillus* values (wt. of mycelium in cg. to 2.5 g. soil) are twice the results obtained by the method of Nehring (mg. K₂O in 100 g. soil), in soils contg. not too much lime and humus. The difference is much higher in soils rich in lime and humus. The method of Riehm (*C. A.*, 38, 3065^a) is the least suitable of the three, since sepn. of the large quantities of Ca originating from Ca lactate is tedious and the soln. obtained is very dil. in respect to K; thus the measurement of galvanometer movements is rather difficult.

2314a. WERNER, O.

Standard Spectrum-Analysis Alloys of the [German] National Material Testing Bureau.

Metallwirtschaft, 23, 321-7 (1944).

C. A., 42, 4093i (1948).

Making-up and casting procedures are given for prepg. arc electrodes: of Pb alloyed with Sb, Bi, As, and Sn (six electrodes covering the range 0.018-0.18% As, 0.10-2.98% Sb, 0.007-1.45% Bi, 0.007-0.56% Sn); of Al alloyed with Si, Mg, Mn, Fe, Cu, and Zn (seven covering the range 0.13-1.5% Si, 0.10-9.5% Mg, 0.12-1.81% Mn, 0.26-0.90% Fe, 0.02-4.7% Cu, 0.02-1.5% Zn); of Fe

alloyed with Si, Mn, Cu, and Cr (five covering the range 0.25-1.70% Si, 0.59-1.25% Mn, 0.15-0.40% Cu, 0.08-0.36% Cr); of Fe alloyed with Si, Mn, Cu, Cr, Ni, Mo, and V (eight covering the range 0.15-1.13% Si, 0.51-1.93% Mn, 0.11-0.46% Cu, 0.13-2.57% Cr, 0.18-4.35% Ni, 0.08-0.77% Mo, 0.16-0.80% V); and of Zn alloyed with trace quantities of Pb, Cd, Sn, Bi, Tl, Mn, and Fe, and with Al, Cu, and Mg (three electrodes covering the range 2.08-8.02% Al, 0.30-3.05% Cu, 0.011-0.061% Mg).

2314b. WBYN, C.

Methods of Calibration in Spectrographic Analysis.

Techn. Wet. Tijdschr., 1944.

Spectrochem. Abs., III, 1940-45 (1947).

A detailed survey of microphotometric methods of evaluating spectra with a brief outline of the underlying photographic theory. After briefly discussing homologous pairs the use of stepped spectra taken through a sector is recommended as best, and the use of measurements on three steps of two lines to evaluate the relative intensity of the lines is described as the best method. This is supplemented by sections on background correction and on the use of graphical calculating devices.

2315a. WILSON, H. D. B.

Geochemical Studies of the Epithermal Deposits at Goldfield, Nevada.

Economic Geology, 39, 37-55 (1944).

Approximately fifty samples of vein material and wallrock from the ore deposits of Goldfield, Nev., were quantitatively analyzed by means of the spectrograph to determine whether the quantitative distribution of certain elements would give some clue to the loci of mineralization. It has been established that three elements, bismuth, silver, and tin, are genetically associated with gold values in the deeper veins. These elements are determinable even in very low-grade vein material. The quantitative variation of some elements in the wallrock gives hope of determining the distance of a given wallrock sample from a vein. Vertical zoning at Goldfield is evident with respect to tin, less definite for bismuth, and probably present among several of the accompanying elements.

2319a. YOUNG, L. G.

The Routine Spectrochemical Analysis of Steel.

Engineer, 128, 116-18 (1944).

Spectrochem. Abs., III, 1940-45 (1947).

A brief account supplementing the work of Barker with useful details of technique. A dustproof fixed slit, adjustments for wear on the electrode stand, and shaping tools for graphite electrodes are described. Lines are

specified for Cr, Cu, Mn, Mo, Ni, Si, and V in steel over a wide range of concentrations. For small concentrations of Ni, Cr, and Mo,

lines are compared with the spectrum background. Spark spectra of solid samples are used.

1945

2321a. ASTUDILLO, M. D.

Application of the Spectrochemical Method to the Analysis of Sulfide Selective-Flotation Concentrates.

Anales fís. y quim. (Madrid), 41, 777-88 (1945).

C. A., 41, 4405f (1947).

The method used is that of Hartley (*Roy. Soc. Phil. Trans.*, 50 (1884), 327 (1889)). The ore contained Pb-Zn-Fe from the Santander zone. It is necessary to form the standards from the same concentrates, analyzed chemically, on account of existing complexity and to avoid introduction of new spectrochem. variables. Mo is a suitable reference element. If one of the fundamentals of the gang can be used as reference element, there is greater simplification.

2323a. BARBOSA, P. E. F. AND BARBOSA, L. M. A.

Quantitative Spectrochemical Analysis by the Total Energy Method.

Brasil, Ministério agr., Dept. nacl. produção mineral, Lab. produção mineral, Bol., No. 18, 11-53 (1945).

C. A., 41, 5047b (1947).

The method of total energy developed independently in Brazil by Alberto B. P. Leme (*Bol. museu nacl.*, 9, No. 3 (1938)) and in the United States by Slavin (*C. A.*, 32, 7367*) was studied in connection with the detn. of Fe, Si, Pb, and Mo in minerals. The linear relationship between wt. of element volatilized in the arc and energy of emission was not verified. Instead, it was observed that the relationship should be expressed as $E = Km^n$, where E is the spectral emission, K a proportionality const., m the mass of element being detd., and n a const. less than one. The value of n depends inversely on the degree of self-reversal of the line being measured, and approaches unity for lines showing no self-reversal. Twenty-five references.

2323b. BARCELÓ MATUTANO, J. R. AND RODRIGUEZ PEREZ, A.

The Use of Saline Mixtures in Spectrochemical Determinations.

Anales fís. y quim. (Madrid), 41, 203-10 (1945).

C. A., 43, 8945e (1949).

A series of 5 metallic alloys was prepd. contg. Pb and a little Cd. A sample of each was dissolved in warm HNO_3 and evapd. to dryness. Spectrograms were made of the 5 original alloys and the 5 saline mixts. formed from them with the 2285 Å line for the Cd and the 2204 Å line for the Pb. The value

$\Delta S = S_{Pb} - S_{Cd}$ was calcd. in each case. The plotted values for $(\Delta S - \log c)$ showed that the values for the mixts. formed a straight line parallel to that for the alloys. This fact permits the substitution of the calibration curve of saline mixts. for the more difficult obtainable one of the alloys.

2340a. BUYANOV, N. V.

The Influence of the Background in a Spectrum on the Intensity of Spectrum Lines as Measured on the Photographic Plate.

Izvest. Akad. Nauk., S.S.S.R. (Fiz.), 5, 293-5 (1945).

Spectrochem. Abs., III, 1940-45 (1947).

A paper on the physical sources of error arising in the microphotometer which cause a change in the apparent relative intensity of a pair of spectrum lines when the background density increases.

2340b. CARLSSON, C. G.

The Spectrochemical Determination of Metallic Impurities in Steel.

Jernkont. Ann., 129, 193-241 (English summary 237-8) (1945).

Spectrochem. Abs., III, 1940-45 (1947).

A comparison is made of solution methods using a.-c. arc, d.-c. arc, and interrupted d.-c. arc with the solid electrode method using the d.-c. arc for Co, Cr, Cu, Mn, Mo, Ni, Sn, Ti, and V in steel. The preferred method for solutions is to work with a 10% solution of the steel as nitrate; any insoluble material is fused with $KHSO_4$ and added to the solution; a carbon rod 3.5 mm. in diam. is treated with 0.02 ml. of steel solution at 150°C. and the arc uses 7 amp. with 100 ignitions per min. lasting 0.2 sec. each time. (Also see *C. A.*, 41, 663h (1947) and *C. A.*, 38, 32124.) The sample is positive and plain carbon negative. Standard synthetic solutions are made and a few calibration lines are illustrated in the range 0.002 to 0.1%. For solid steel electrodes, rods 4 mm. diam. are used with an intermittent d.-c. arc using only 3.6 amp. and 0.08 sec. running each $\frac{1}{10}$ min. A list of useful lines is given for a dozen other elements besides those mentioned above for which quantitative tests were made with satisfactory precision.

2341a. CHANG, T. C.

Chemical Studies on Chinese Fluorites.

III. Y, Nd, Ce, Sm, La, and Pr in a Fluorite from Iwu.

J. Shanghai Sci. Inst. [N.S.], 5, 223-30 (1945).

C. A., 41, 2352e (1947).

An arc spectrographic method, employing Al as a matrix in the knowns as a substitute for Y, showed that La, Ce, Pr, Nd, and Sm were 0.03–0.1, 0.1–1, 0.03–0.1, 1–3, and 0.1–1%, resp., of the Y content of the fluorite from Lenshuikang.

2349a. CURRAH, J. E., BEAMISH, F. E., ALLEN, W. F., AND BARTLET, J. C.

Spectrographic Detection of Trace Amounts of Uranium. Determination of Uranium in Manganese Dioxide.

Natl. Research Council, Can. At. Energy Project, N.R.C. No. 1628, 5 pp. (1945). C. A., 42, 6701a (1948).

Aliquots of the nearly neutral soln. are measured onto the craters of the Ag bottom electrodes, and the water is removed by evapn. at 120°. Then, with both electrodes in place and with a 3-mm. gap, a current of 4 amp. at 220 v. is passed for 30 sec. The relative intensities of the U lines at 4090.1 and 4543.6 Å compared with lines obtained with known quantities of U are measured. To det. U in MnO₂, dissolve 5 g. of sample in HNO₃ + 30% H₂O₂. Heat to destroy excess peroxide, and ext. the 16–18 ml. of soln. with 10 ml. of hexone. Drain off the aq. layer and ext. again with 10 ml. of hexone. To the combined exts., add 3 ml. of HNO₃ and 5–6 glass beads. Heat for about 30 sec. and ignite the hexone that evaps. Continue heating until a black charred mass is obtained. Add about 3 ml. of concd. H₂SO₄ and heat to fumes. Cool, and add concd. HNO₃ dropwise to destroy org. matter. Then evap. off all acid, and take up in a little water. Filter, evap. to 0.1–0.3 ml. and transfer to the pure Ag electrode. Examine the U line at 4543.6 Å. Caution is necessary as hexone-HNO₃ is likely to explode when heated. Representative spectra are shown.

2353a. ERÄMETSÄ, O.

Zinc Contents of Finnish Nonmetallic Minerals.

Ann. Acad. Sci. Fennicae, Ser. AII Chem., 14, 1–12 (1945) (in German).

C. A., 41, 670i (1947).

Spectrographic Zn detns. were carried out on a no. of Finnish nonmetallic minerals. The Zn lines 4810.5, 4722.2, and 4680.1 Å were used for the analysis. The spectra obtained with the use of the Cu arc were compared visually with a series of spectra of standard mixts. The lower limit of sensitivity was for the first 2 lines 0.003% ZnO and for the third line 0.01% ZnO. Several per cent of Zn were found in a garnet from Lupikko in Pitkäranta. The role of Zn in crystal lattices is discussed on the basis of the ZnO contents. The amphiboles, pyroxenes, and biotite are found to be the most important carriers of Zn in magmatic rocks. The skarn

grossularites from Orijärvi and Pitkäranta contain appreciable amts. of ZnO (0.1–0.40%). This result is interpreted as being due to the abundant occurrence of Zn in these areas which also leads to the formation of Zn ores.

2367a. GABRIELSON, O.

Studies on the Distribution of Elements in Swedish Sphalerites.

Sveriges Geol. Undersökn., Ser. C, Avhandl. och Uppsatser, No. 468, *Arsbok* 39, No. 1, 1–52 (1945) (English summary, 49–50).

C. A., 41, 1963i (1947).

A general survey of the occurrence and amts. of the elements Zn, Cd, Ga, In, Ge, Mn, Fe, Co, Ni, Cu, Ag, Sn, Pb, Mg, Al, and Si in Swedish sphalerites is presented in relation to their geol. appearance and genetic relations. The material analyzed consisted of 78 samples of sphalerite from sulfide ores of central and southern Sweden, from Skellefte Field, from Archean limestones, Post-Archean sediments, and from fracture fillings and pegmatite veins. The detns. were carried out by means of spectrographic methods, in d.-c. C arc cathode layer and in intermittent arc. The presence of the elements Hg, As, Sb, and Bi was established qualitatively with the spectrograph. Some of the values found for Fe, Mn, and Cd were checked chemically; the agreement was good. Short geol. descriptions of the occurrences are given. The following avs. were found for all samples: Cd 0.173%, Ga 0.0045, In 0.0047, Ge from 0.001 to 0.01, Mn from 0.001 to 5.4, Fe 8.78, Co from 0.001 to 0.05, Ni from 0.001 to 0.02.

2368a. GATTERER, A.

Spectrochemistry. The most important spectrochemical papers published in Germany in 1939–42.

Pontificia Acad. Sci., Relationes de auctis scientiis tempore belli A. 1939–45, No. 2, 1–21 (1945) (in German).

C. A., 41, 1147d (1947).

This is a classified directory of 130 spectrochem. papers published in German during World War II in Germany and adjoining countries. An appendix is given contg. a list of 16 foreign original papers published in *Spectrochimica Acta* in 1939–43.

2368b. GATTERER, A., JUNKES, J., AND FRODL, V.

Atlas of Persistent Spectra. II. Spektren der seltenen Erden.

Specola Vaticana, Vatican City (1945), 347 pp.

C. A., 42, 7640b (1948).

This covers in text and charts the spectra of the rare earths La 57 to Lu 71, and elements Sc 21, Y 39, Zr 40, and Th 90 in the re-

gion 2260 to 7600 Å. Reviewed in *Spectrochim. Acta.*, **4**, 176 (1950).

2387a. LANDERGREN, S.

Geochemistry of Boron I. Spectrochemical Determination of Boron in Silicate Rocks and Sediments.

Arkiv. Kemi., Mineral, Geol., **19A**, No. 25, 7 pp. (1945).

Spectrochem. Abs., **III**, 1940-45 (1947).

Arc spectra and powders in a Cu cathode are used for determining B in ores, the powdered ores being mixed with an equal weight of pure feldspar. Comparison of B lines with Sb added as an internal standard is necessary with a high dispersion to avoid masking of B by Fe lines.

2391a. LOPEZ DE AZCONA, J. M., SANTOS RUIZ, A., AND DÉAN GUELLENZU, M.

Trace Elements in Spanish Foods of Vegetable Origin. I. Cereals and Legumes. *Anales ffs. y quim. (Madrid)*, **41**, 1358-67 (1945).

C. A., **41**, 5648f (1947).

Al, Cu, Fe, Mn, Si, Ti, Li, and Ni were found in all samples analyzed. The presence of Ni is accounted for by the fact that the samples of Spanish soils examd. spectroscopically by the authors contained Ni between 10^{-4} and 10^{-6} . Lines 2634.78 and 3071.59 Å of Ba appear like ghost lines; this indicates contents approaching the limit of sensitivity. Ag appeared in 90% of the samples of cereal, but not in legumes. Co was found in soils, but not in any cereals; in legumes it appears concd. in the seeds. Mo was not found in any of the cereals or legumes, but was found in tapioca. Pb appeared in 90% of the cereals and in 42% of the legumes. Sn was found in only 1 sample, canned peas, probably derived from the can. V was not found in any legume, but occurred in 50% of the cereals. No Cr or Sb was found. B could not be detd., on account of impurity in the carbons. No results for Zn are given, because Na, Ca, and Ti interfere with the stronger Zn lines; the less sensitive Zn line 3075.9 Å was not found in any of the spectrograms.

2406a. PEET, A. B.

Cleaning Spectrograph Slits.

Rev. Sci. Instruments, **16**, 130 (1945).

Spectrochem. Abs., **III**, 1940-45 (1947).

Washing down the slit with a drop of ethyl ether is said to be better than brushing the slit.

2410a. PROKOF'EV, V. K.

The Structure of Alloys and Quantitative Spectrum Analysis.

Bull. acad. sci. U.R.S.S., Sér. phys., **9**, 366-375 (1945).

Spectrochem. Abs., **III**, 1940-45 (1947).

Calibration lines for the estimation of the same element in different alloys have been compared, and it is found that in general the slope of the lines is similar. The properties of the alloys produce lateral displacements in the calibration lines. The reason for these changes have been sought by applying X-ray analysis to the sparked surfaces of electrodes.

2411a. PROKOF'EV, V. K.

Spectral Analysis of Difficultly Excitable Elements.

Bull. acad. sci. U.R.S.S., Sér. phys., **9**, 691-8 (1945).

C. A., **42**, 5793h (1948).

The spectrographic detn. of halides, S, C, and gaseous O_2 , H_2 , and N_2 is reviewed. Halides and S compds. in aq. soln. can be detd. by means of an a.-c. arc, with a large-capacity shunt, in a circuit with low self-inductance; both electrodes are of Cu. The soln. is dropped on to the lower electrode, or the lower electrode is made in the form of a rotating disk which dips into the soln. Observations are taken in the region near the moist electrode. An aperiodic discharge of brief flashes is obtained. Spectral lines clearly seen under these conditions are: S 5454, 5432, 5640, 5032; C 4267; P 5253, 5426, 5499; I 5625, 5600, 5464, 5245, 5161; Cl 4904, 4819, 4810, 4794; F 6856, 6902; Br 4704, 4785, 5332. Br in KBr soln. is detected at a concn. of 0.001%; S in $CuSO_4$ soln. is detd. down to a concn. of 0.002% S from the lines S 5454 and Cu 5463 Å though not in presence of dichromate ion. C in steel and cast Fe is detd. by the spark discharge, with either the diffuse line 4267, when the intensity has to be summed over the whole contour of the line, or the sharp line 2297 in the spectrum given by a large Hilger spectrograph. In cast Fe the different state of the C has no effect on the intensity of the lines and all the points in the graph obtained lie on one straight line.

2411b. PROKOF'EV, V. K.

Spectrochemical Determination of Small Quantities of Boron in Steels.

Doklady Akad. Nauk S.S.S.R., **50**, 185-7 (1945).

C. A., **44**, 3398e (1950).

C is superior to Cu, Al, and steel as an opposite electrode for this detn.; the only B-free C obtainable was birch charcoal. By using a 10-15 amp. a.-c. arc, B was detd. in the 0.001-0.003% range by measuring B 2496.78.

2414b. RAISIG, R.

Spectrographic Analysis of the Zinc-Base Die-Casting Alloys.

Die-Casting, **3** (9), 36, 37, 39, 40 (1945).

Spectrochem. Abs., **III**, 1940-45 (1947).

Zinc rods cast in glass tubing and either arc or spark spectra on both grating and prism

spectrographs are used for both the impurities and the Cu and Al in die-casting control analysis. A d.-c. arc with its own generator set is used for maximum sensitivity down to 0.001% Pb, Cd, and Sn with the sample rods in air-cooled aluminum electrode holders. Spark spectra are used when only impurities above 0.003% are being tested. Precision of the order of 3% of the amount present is claimed and details of technique are tabulated for Al, Cu, Mg, Pb, Sn, Cd, and Fe.

2414c. RICARD, R. AND CORNU, A.

New Method of Spectrographic Analysis.

Rev. mét., **42**, 389-92 (1945).

C. A., **41**, 3009f (1947).

The intensities of given lines of a standard sample and of a specimen are directly compared by arcing them simultaneously, reflecting the light from a glass cylinder which occupies the place of a light source in a conventional spectroscope, and passing both beams through a collimator and the prism onto a photographic plate. Light-generating devices are placed on the sides of the optical axis of the spectroscope. The slit is omitted because the vertical glass cylinder forms a linear reflection having a high light intensity. The width of this reflection is detd. from the formula $L \tau \cos \varphi / ad$ where L is the size of light source, r radius of the reflecting cylinder, a focal distance of the collimator, d distance between the light source and the cylinder, and φ indicates the point of incidence on the cylinder. With L 5 mm., r 4 mm., a 500 mm., d 500 mm., and a small φ , the width of the image becomes 0.04 mm. The images are slightly shifted in the direction of wavelength on account of different foci of light sources. The method of simultaneous arcing eliminates the effect of current variations, saves time, permits keeping one standard sparking while specimens are changed, and calls for plates suitable for only one wavelength.

2415a. RIBHM, H.

Determination of Potassium in Lactate Extracts with the Flame Photometer Without Precipitation of Calcium.

Bodenkunde u. Pflanzenernähr., **36**, 109-20 (1945).

C. A., **41**, 4600a (1947).

In detg. K in lactate exts. of soils with the flame photometer using an C_2H_2 flame, the Ca which is present in large excess must be previously pptd. because the "Schott" filter RG8 which is used for the detn. transmits Ca light. R. recommends $(COOH)_2$ as the precipitant instead of NH_4 oxalate. The ppt. becomes cryst. from the start and does not absorb any K. It deposits quickly, and about $\frac{1}{2}$ hr. after the pptn. the soln. is clear enough to measure the K content. When illuminating gas is substituted for C_2H_2 (cf. Herrmann and Lederle, *C. A.*, **38**, 1399³), the

pptn. of the Ca becomes unnecessary, because the flame of illuminating gas is not hot enough to stimulate very many Ca lines. It is probable that the use of a more suitable filter would even make the pptn. of Ca in the C_2H_2 flame unnecessary. Several filters have been tested; "Schott" filter RG9 proved somewhat better than RG8, but it is not satisfactory.

2420a. RYNNINGER, R.

A Method for the Spectrographic Analysis of Low-alloy Steel.

Jernkontorets. Ann., **129**, 1-31 (1945).

Spectrochem. Abs., **III**, 1940-45 (1947).

Spark spectra are used for the estimation of Mn, Si, Cu, and Mo in steel up to 1%, or for Cr and Ni up to 5%. An investigation of pre-exposure sparking time in terms of minutes per sq. mm. of area of the sample is described; the effect on the Cr content varies with percentage of Cr. Comparison with chemical analysis and statistical treatment of precision is given. The effect of heat-treatment on the spectra of a 1.5 Cr steel was found to be negligible, but the pre-sparking produces a modified layer of material 0.002-0.004 mm. deep on the sample surface. (See also *C. A.*, **41**, 3398e (1947).)

2420b. SAREDO, J. F.

Systematic Method for Semimicro Analysis for the Alkali and Alkaline Earth Metals, Including Lithium.

Anales asoc. quim. farm. Uruguay, **47**, 100-8 (1945).

C. A., **40**, 497⁴ (1946).

The procedure is divided into 5 steps: (1) transformation of the alkali and alk. earth salts (all other metals being first removed) into the nitrates and partial elimination of NH_4 salts; (2) sepn. and characterization of Sr and Ba by the insoly. of their nitrates in HNO_3 ; (3) sepn. and characterization of Ca by the insoly. of $CaSO_4$ in aq. alc.; (4) isolation of the remaining sulfates and analysis for Li (spectroscopically), Mg (by pptg. the phosphate), and K (by pptg. the cobaltinitrite); (5) detn. of Na in the presence of K or Li by the use of the differential solubilities of the sulfates in aq. alc.

2422a. SCHOOF, J.

Spectrographic Determination of Cadmium in Copper with the Use of an Intermittent Arc.

Rev. mét., **42**, 333-5 (1945).

C. A., **41**, 46f (1947).

By starting the arc with a high-tension spark, using a Balz-Kaiser centering device, pre-heating 45 sec. at 4 amp. and 15 sec. at 2 amp. and using an arc current of 2 amp., the lines Cu 2276.25 and Cd 2265.02 can be used to det. 0.2-0.7% Cd.

2436a. SMITH, G. S.

Spectrochemical Analysis.

Metal. Ind. (London), **67**, 226-228 (1945).*Spectrochem. Abs.*, **III**, 1940-45 (1947).

A summary of recent progress in the technique of spectrochemical analysis in the U.S.S.R. by visual and photographic methods.

2447a. SVENTITSKIĬ, N. S.

Spectrographic Determination of Carbon in Cast Iron and Steel, with a Low-Voltage Discharge.

Doklady Akad. Nauk S.S.S.R., **50**, 189-90 (1945).*C. A.*, **44**, 3404a (1950).

In order to reduce series inductance in the discharge circuit, and thus permit observation of CIII 2297 and CII 4267, S. coupled the trigger spark circuit directly across a 0.1 microhenry series inductance, eliminating the Tesla transformer. It was, therefore, necessary to use a 1-mm. analytical gap. The slope of the working curve obtained was considerably greater than that obtained with a conventional spark source.

2447b. TAKVORIAN, S.

Search for the Element 61.

Ann. chim., **20**, 113-60 (1945).*C. A.*, **41**, 5790g (1947).

After surveying previous efforts to isolate the element 61, a new systematic approach to this problem is described. Using monazite sand exts., X-ray absorption and emission methods, flame spectra and study of the radioactivity of enriched fractions were applied, without success in isolating element 61. New flame spectrum lines of Nd and Sm were defined in the region from 3100 to 3200 Å. In

studying the radioactivity of fractionation products, results obtained by Hevesy and Pahl (*C. A.*, **27**, 660) concerning the radioactivity of Sm were found to be correct, while Libby and Latimer's findings (*C. A.*, **27**, 1270) relative to the radioactivity of La and Nd could not be confirmed. The isomorphism of Ac salts with rare earth elements was established.

2460a. YGBERG, E. R.

Svanbergite from Horrsjöberg.

Arkiv Kemi, Mineral., Geol., **A20**, No. 4, 17 pp. (1945) (in English).*C. A.*, **41**, 667a (1947).

The chem. and mineralogical properties of svanbergite are investigated. The mineral is found as a rare constituent in kyanite-bearing quartzite at Horrsjöberg, parish of N. Ny, Värmland, Sweden. Other constituents of the rock are pyrophyllite, diaspore, rutile, mica, and hematite. The phys. properties of svanbergite are described; results of geometrical and X-ray crystallographic detns. are presented. A new analysis of svanbergite gave: SiO₂ 1.42, Al₂O₃ 32.68, Fe₂O₃ 0.55, FeO —, CaO 1.75, SrO 17.99, BaO —, MgO 0.44, PbO —, Na₂O + K₂O 0.40, P₂O₅ 17.55, SO₃ 15.66, H₂O < 105° 0.20, H₂O > 105° 11.39; total 100.03%. Sp. gr. 3.20. Results of a qual. spectrochem. analysis by the C-arc method are presented. The formula SrAl₂(SO₄)(PO₄)(OH)₄ is computed for svanbergite, which is considered an anhyd. sulfate contg. the anions OH⁻ and PO₄³⁻ in addn. It is isomorphous with members of the beudantite group. Another svanbergite from Westana in Sweden contains 3.82% PbO and thus is a plumbosvanbergite. The isomorphism between woodhouseite and svanbergite is also well established.