

micaceous) phase. The melting point of this compound is 790° C. It is uniaxial negative with a mean index of about 1.544. Its birefringence is less than that of quartz, probably near 0.004.

$\text{MnF}_2 \cdot \text{ZnF}_2$ was prepared by treating a mixture of MnCO_3 and ZnF_2 of the proper stoichiometric proportions with an excess of HF, evaporating to dryness and fusing the resulting powder in a graphite crucible at 1000° C. A single phase results, uniaxial positive, $\omega = 1.487$, $\epsilon = 1.517$; m.p. = 897° C.

A double compound, $\text{ZnF}_2 \cdot \text{ZnCl}_2$, was made by fusing together the two components. It melts at 685° C, is biaxial, positive, $2V = 70^\circ$; mean index, ca. 1.70, birefringence less than quartz.

The properties of the compounds, the preparations of which are described above, are assembled in the accompanying table.

PROPERTIES OF ZnF_2 AND RELATED COMPOUNDS

Compound	Melting Point ° C.	Optical Character	2V	ω or α	ϵ or γ	Biref.
ZnF_2	872	Uniaxial+	—	1.510	1.526	.016
$\text{ZnF}_2 \cdot 4\text{H}_2\text{O}$	d. < 100	Biaxial —	$50^\circ \pm$	1.46	1.47	.010
$\text{NH}_4\text{F} \cdot \text{ZnF}_2$	d. < 150	Uniaxial+	—	1.47	1.481	.011
$\text{MgF}_2 \cdot \text{ZnF}_2$	1185	Uniaxial+	—	1.40	1.41	.010
$\text{CaF}_2 \cdot \text{ZnF}_2$	796	Uniaxial—	—	1.465	1.455	.010
$\text{SrF}_2 \cdot \text{ZnF}_2$	729	Uniaxial—	—	mean index	1.455	< .009
$\text{BaF}_2 \cdot \text{ZnF}_2$	790	Uniaxial—	—	mean index	1.544	.004 ±
$\text{MnF}_2 \cdot \text{ZnF}_2$	897	Uniaxial+	—	1.487	1.517	.030
$\text{ZnF}_2 \cdot \text{ZnCl}_2$	689	Biaxial +	$70^\circ \pm$	mean index	1.70	< .009

DETECTION OF FLUORITE IN SANDS WITH ZIRCONIUM-ALIZARIN SOLUTION

ROBERT M. GROGAN, *Illinois State Geological Survey*.*

The presence of grains of fluorite in natural sands or other assemblages of loose mineral fragments may be readily detected with the aid of a zirconium-alizarin test solution described by Feigl.¹ The technique described here was adapted and used recently in the examination of soil samples taken from above known or suspected fluor spar veins in the fluor spar mining district of southern Illinois. The purpose of this study

* Published by permission of the Chief, Illinois State Geological Survey, Urbana, Illinois. Since May 1, 1951 the author has been employed as Geologist, Development Department, E. I. du Pont de Nemours and Co., Inc., Wilmington, Delaware.

¹ Feigl, Fritz (1937), Qualitative analysis by spot tests, 161-163.

was to test the thesis that concealed veins might be discovered or the course of known veins traced by means of grains of fluorite in the soil which would thus be an aid to prospecting.

Portions of the soil samples are soaked in water, dispersed in a mechanical stirrer with the aid of a little sodium silicate defloculant, and wet-sieved over a 200 mesh screen. After drying, the fraction coarser than 20 mesh is removed by sieving, and the remainder separated into light and heavy fractions with bromoform. The heavy fraction is then freed of most of its content of limonitic pellets with an electromagnet and then tested for fluorite. This is accomplished by spreading the grains thinly and evenly over the surface of Whatman No. 1 filter papers 9.0 centimeters in diameter which have been dipped in zirconium-alizarin solution and suspended within watch glasses 10.0 centimeters in diameter in such manner that only the edge of the paper makes contact with the glass. The solution imparts a deep red-violet color to the papers. Yellow spots appearing after an interval of 10 to 20 minutes indicate the presence and location of fluorite grains. Often the yellow spots can be best seen by holding the watch glass up to a light and viewing the test paper from the underside. Larger watch glasses inverted over the ones supporting the filter papers prevent the latter from drying too quickly.

The zirconium-alizarin solution is made as recommended by Feigl; 0.05 g. of zirconium nitrate is dissolved in 50 cc. of water and 10 cc. of concentrated hydrochloric acid, and mixed with a solution of 0.05 g. of sodium alizarin sulfonate (Alizarine Red S) in 50 cc. of water. This solution is quite stable. Fluorite grains in contact with the solution are partially dissolved, with the result that the colorless complex ion $(ZrF_6)^-$ is formed and alizarin, a yellow dye, is liberated in the immediate vicinity of the grains.

The only interfering substances encountered in the recent studies were iron compounds, mostly in the form of limonite pellets, and fragments of a material of unknown composition which softened and disintegrated on exposure to the test solution. The limonite is slowly attacked by the hydrochloric acid and the resulting iron chloride stains the paper yellow, an effect noted principally when the paper dries. The fragments of unknown composition reacted with the solution faster than fluorite and produced white spots rather than yellow ones. Sulfate ion interferes with the test if it is in solution, but preliminary tests showed that barite, the only sulfate apt to occur in the soil samples studied, did not dissolve and react with the zirconium-alizarin solution. In applying the test to new materials it would be advisable to check results with the microscope until the operator was able to distinguish between spots produced by fluorite and by interfering substances.

The technique as used so far was designed to be only roughly quantitative. Roughly equal volumes of the heavy fractions were used each time and a record kept of the number of fluorite grains noted. By using weighed amounts of material more exact determinations of fluorite content could be made. Experiments with artificial mixtures of fluorite and quartz sand showed that as little as 0.1% of fluorite could be easily detected.

The zirconium-alizarin technique was developed to supplant the microscopic methods formerly used for detecting fluorite. It is a routine operation which can be done by personnel not trained in the use of the microscope, it consumes less time and is probably more accurate on low-fluorite samples than the microscope method.

FIRST INTERNATIONAL CONVENTION OF MINERAL RESOURCES

Mexico City, October 29 to November 4, 1951

The Mineralogical Society of America has accepted an invitation to participate in this convention and it is hoped that many Fellows and Members of the Society will make an effort to be present.

The convention will consist of the following meetings to be held concurrently:

FIRST NATIONAL CONGRESS OF MINERAL RESOURCES

GENERAL MEETING NO. 172 OF THE AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS

THIRD CONGRESS OF THE PANAMERICAN INSTITUTE OF MINING ENGINEERING AND GEOLOGY

For further information address Ing. Raúl de la Peña, Director General, Instituto Nacional para la Investigacion de Recursos Minerales, Av. Morelos No. 110, Desp. 207, México 1, D. F., México.

The first issue of the *Journal of Geological Education*, published by the Association of Geology Teachers, appeared in April 1951. Volume 1, No. 1 is devoted to teaching methods in mineralogy. Nine short articles comprise the Contents as follows: Geological Mineralogy by C. J. Roy; Mineralogy for Embryonic Professional Geologists by D. Jerome Fisher; An Outline of a Course in Elementary Mineralogy by Cornelius S. Hurlbut, Jr.; Automatic Testing Program in Mineralogy by A. C. Swinnerton; Teaching Procedure in Undergraduate Mineralogy Courses by Kiril Spiroff; Crystallography in the General Mineralogy Course by Brian Mason; Mineralogy and Crystallography in Engineering Curricula by Oliver R. Grawe; Binocular Microscope Studies in the Teaching of Mineralogy and Petrology by R. W. Edmund; and Cleaning Mineral Specimens by David E. Jensen.

The *Journal of Geological Education* is published semiannually by the Association of Geology Teachers. The annual subscription price is \$2.00. Single issues are \$1.15. The officers for 1950-51 are:

President—Paul R. Shaffer (University of Illinois).

Vice-President—Rudolph W. Edmund (Augustana College).

Secretary-Treasurer—Raymond C. Gutschik (University of Notre Dame).

Editor—William F. Read (Lawrence College).

Heinrich Ries, professor emeritus of economic geology, Cornell University, died April 11 at Ithaca, New York, at the age of seventy-nine years.

To correct some errors which have been discovered in the fourth edition of Part II of Winchell's Elements of Optical Mineralogy an errata sheet is now available by request from the publishers, John Wiley and Sons, of New York.

MINERALOGICAL SOCIETY (LONDON)

A meeting of the Society was held on Thursday, June 7, 1951, in the apartments of the Geological Society of London, Burlington House, Piccadilly, W.1 (by kind permission).

The following papers were read:

- (1) A new beryllium mineral, discovered as a gem-stone.

By Mr. B. W. Anderson, Mr. C. J. Payne and Dr. G. F. Claringbull, with a microchemical analysis by Dr. M. H. Hey.

This pale-mauve transparent mineral at present known only as two faceted gemstones is hexagonal with $a=5.72 \text{ \AA}$ and $c=18.38 \text{ \AA}$; space group $D_6^0=C6_32$. Refractive indices $\omega=1.723$ (1.721), $\epsilon=1.719$ (1.717); density 3.62 (3.59). Microchemical analysis gives the composition $\text{Be}_4\text{Mg}_4\text{Al}_{16}\text{O}_{32}$.

- (2) The amygdale minerals in the Tertiary lavas of Ireland. (1) The distribution of chabazite habits and zeolites in the Garron plateau area, Co. Antrim.

By Mr. G. P. L. Walker.

It has been found possible to arrange chabazite habits in a habit series ranging from the simple, untwinned unit rhombohedron to the complex-twinned varieties, phacolite and herschelite. A habit notation is proposed, and a habit distribution map, perhaps the first of its kind to appear, has been prepared of seventy square miles of basalt lavas in the Garron plateau area in the east of Co. Antrim, accompanied by a section. The distribution is so regular that the habit seems to have been controlled by the temperature. The Chabazite habits fall into a number of well-defined zones superimposed upon, and therefore later than the lavas, but clearly shifted by several faults. The zeolites associated with the chabazite are described and their distribution considered. Analcime, which falls into a zone towards the base of the lavas appears, unlike the chabazite, to post-date the faulting. It is therefore possible to establish a relative chronology of events following the eruption of the lavas. Regarding the origin of the zeolites, the distribution of chabazite habits and analcime appears to support the idea which is put forward that, once initiated, the reactions resulting in the hydration of the pyrogenetic minerals in the basalts to zeolites and chlorites are capable of generating sufficient heat to maintain these reactions.

- (3) Notes on the copper deposits of Middleton Tyas and Richmond.

By Mr. M. T. Deans.

These deposits, worked mainly in the eighteenth century, occur as flats, pockets and thin veins in the Carboniferous Limestone not far below the former surface on which Permian rocks rested. Chalcocite predominates in the east, chalcopyrite in the west, and covelline and bornite are well developed, together with malachite, azurite and a little native copper. Replacements among the copper minerals are described, also chalcocite