

**THE  
AMERICAN  
JOURNAL OF SCIENCE.**

**EDITOR: EDWARD S. DANA.**

**ASSOCIATE EDITORS**

**PROFESSORS GEORGE L. GOODALE, JOHN TROWBRIDGE,  
W. G. FARLOW AND WM. M. DAVIS, OF CAMBRIDGE,**

**PROFESSORS ADDISON E. VERRILL, HORACE L. WELLS,  
L. V. PIRSSON AND H. E. GREGORY, OF NEW HAVEN,**

**PROFESSOR HENRY S. WILLIAMS, OF ITHACA,**

**PROFESSOR JOSEPH S. AMES, OF BALTIMORE,**

**MR. J. S. DILLER, OF WASHINGTON.**

---

**FOURTH SERIES**

**VOL. XXXII—[WHOLE NUMBER, CLXXXII.]**

---

**NEW HAVEN, CONNECTICUT.**

**1911.**

ART. XVI.—*Ferritungstite*, a New Mineral; by WALDEMAR T. SCHALLER.

A SAMPLE of tungstic ocher was collected in the State of Washington by Mr. Howland Bancroft, of the U. S. Geological Survey. The exact locality is the Germania Tungsten Mine, Deer Trail mining district, northeastern part of the State of Washington. Mr. Frank L. Hess, also of the U. S. Geological Survey, suggested that the tungstic ocher might prove of sufficient interest to warrant careful study. On microscopic examination, the earthy looking ocher was found to be well crystallized and pure and chemical tests showed that the ocher was a hydrous ferric tungstate, entirely different from ordinary tungstic ocher, called tungstite, which, as Walker\* showed, has the formula  $WO_3 \cdot H_2O$ . For the privilege of describing this interesting new mineral, I am indebted to the two gentlemen above named.

Examination under the microscope shows that *ferritungstite* crystallizes in hexagonal plates, evenly developed but very minute. Those lying flat on the base are isotropic under crossed nicols, but are too small to exhibit any interference figures. Such crystals as are partially tilted, show decided double refraction on their edge. A small quantity of gangue, mostly quartz, is mixed with the mineral but limonite stains are almost absent, though occasionally a little can be seen.

*Ferritungstite* results from the oxidation of wolframite and is associated with that mineral in massive quartz. The cleavage, hardness and density of *ferritungstite* could not be determined. The color is pale yellow to brownish yellow when pure. It gives off water in a closed tube, and is decomposed by acids, yellow oxide of tungsten separating out.

Only a few tenths of a gram of pure material were available for analysis. Two samples were collected at different times from the same specimen. Qualitative tests showed the absence of  $MoO_3$ ,  $SO_3$ ,  $P_2O_5$ , and, in general, of substances other than those given in the analyses. The analyses of the two samples are given below.

*Analyses of ferritungstite.*

	1	2
WO <sub>3</sub> .....	37.1	35.8
Fe <sub>2</sub> O <sub>3</sub> .....	26.6	27.3
H <sub>2</sub> O (Ign.) .....	18.6	20.9
Insol. ....	14.7	[16.0]
	<hr/> 97.0	<hr/> 100.0

\* This Journal (4), xxv, 305, 1908.

The ratios deduced herefrom are shown in the following table:

*Ratios of analyses of ferritungstite.*

	1	2
WO <sub>3</sub> .....	·16 or ·94	·15 or ·88
Fe <sub>2</sub> O <sub>3</sub> .....	·17 " 1·00	·17 " 1·00
H <sub>2</sub> O .....	1·03 " 6·06	1·16 " 6·82

These ratios are close enough to 1:1:6 to show that the formula for *ferritungstite* is Fe<sub>2</sub>O<sub>3</sub>.WO<sub>3</sub>.6H<sub>2</sub>O. Below are shown the two analyses with the insoluble matter deducted and recalculated to 100 per cent, compared with the theoretical values calculated from the formula Fe<sub>2</sub>O<sub>3</sub>.WO<sub>3</sub>.6H<sub>2</sub>O.

*Comparison of analyses with calculated composition.*

	Analysis 1	Analysis 2	Calculated
WO <sub>3</sub> .....	45·1	42·6	46·4
Fe <sub>2</sub> O <sub>3</sub> .....	32·3	32·5	32·0
H <sub>2</sub> O .....	22·6	24·9	21·6
	<hr/> 100·0	<hr/> 100·0	<hr/> 100·0

The mineral is different from any described and the new name proposed, *ferritungstite*, shows its chemical relation to ordinary tungstic ocher or tungstite.

Chemical Laboratory,  
U. S. Geological Survey.