back-to-back with the photomicrographic negatives it will compensate for the density variations and make printing or enlarging a matter of comparative ease. It will not significantly affect definition.

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MAGNETIC SUSCEPTIBILITY OF NATURAL RUTILE, ANATASE, AND BROOKITE

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Precision measurements of the magnetic susceptibility of synthetic rutile and anatase have recently been made by Senftle and others (in press). On these specially purified forms of TiO_2, magnetic susceptibilities of $(0.067 \pm 0.0015) \times 10^{-6}$ and $(0.040 \pm 0.0003) \times 10^{-6}$ electromagnetic units per gram were obtained for rutile and anatase, respectively. Because of technical difficulties in preparation, it was not possible to prepare magnetically pure brookite; and, hence, no measurements were reported on this crystallographic form of TiO_2.

To compare the susceptibilities of natural crystals with the above data on synthetic crystals and to obtain approximate susceptibility data for brookite, the magnetic susceptibility of natural crystals of these minerals was measured at room temperature. The method of analysis has been described in detail by Senftle and others (1958). In each measurement corrections were made for ferromagnetic impurity by making a $1/H$ plot previously described. The results are shown in Table 1.

The per cent variation for rutile is significantly less than for anatase, whereas that for brookite is very large. This variation is a function of the purity of the crystals. It is relatively easy to prepare magnetically pure rutile, anatase is considerably more difficult, and as far as is known, no magnetically pure brookite has ever been made. M. D. Beals (National Lead Company, oral communication, 1958) finds that to a large extent the impurity in anatase consists of volatile compounds that are removed above 650° C. when rutile is formed. The higher purity would account for the smaller range in susceptibility of rutile. The higher temperatures, however, convert the impurities to compounds with somewhat higher susceptibilities. This phenomenon has been noticed when heating otherwise stable minerals to temperatures above 600° C.

Some of the brookite specimens contained a fairly large amount of impurity. Specimen R-2108 showed no ferromagnetic impurity, but the paramagnetic impurities were significant. The inhomogeneous dispersion of the impurities in the crystal was evident in the color change from a light transparent brown to a dark opaque brown, as well as from the spread in the susceptibility observed for several fragments of the same crystal. The other three specimens of brookite showed weak ferromagnetism, but the impurities were more uniformly distributed.

Table 1. Magnetic Susceptibilities of Natural TiO_2 Minerals

TiO_2 Mineral	U.S. National Museum no.	Location	χ (10^{-6} emu/gram)
Rutile	2063	Blumberg, near Adelaide, South Australia	1.07
	R-2076	Alexander County, North Carolina	0.98
	112990	Brooks Farm, North Carolina	0.95
	52-MT-5*	Beach Sand, Melbourne, Australia	0.91
	45-MT-47*	Beach Sand, Vero Beach, North Carolina	0.83
Anatase	R-2097	Diamantina, Brazil	0.19
	112990	Brooks Farm, North Carolina	0.24
	2103	Tasdatsch, Tavetsch, Switzerland	0.36
Brookite	97016	Magnet Cove, Arkansas	1.15
	1710	Somerville, Massachusetts	0.83
	81463	Ulster County, New York	0.26
	R-2108	Von der Soule viven, Tyrol, Switzerland	0.63–1.53

* U. S. Geological Survey sample numbers.

The specimen from Ulster County, New York (No. 81463) is of particular interest because of its relative purity. Semiquantitative spectrographic analyses showed only silicon and iron in the range of 0.01 to 0.1 per cent, and copper, magnesium, and manganese in the range of 0.0001 to 0.001 per cent. This purity compares with that of the synthetic rutile previously reported. The magnetic susceptibility of 0.26×10^{-6} emu/gram can therefore be considered as an upper limit of pure brookite. However, in view of the low susceptibilities of synthetic rutile and anatase, this value is probably considerably higher than the true value.

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NATIVE SELENIUM FROM GRANTS, NEW MEXICO*

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Introduction

In the course of working on a calibration curve for the determination of selenium by an x-ray spectroscopic method, a sample containing native selenium was encountered. This sample (No. 760) was collected from the Marquez mine of the Uranium Division, Calumet and Hecla, Inc., in Section 23, T.13N., R.9W., McKinley County, New Mexico, about 20 miles north of Grants.

Occurrence

The native selenium occurs in a claystone gall in the Brushy Basin member of the Jurassic Morrison formation. The Brushy Basin member is generally subdivided into three parts (see Freeman and Hilpert, 1956). The upper part consists mainly of claystone and clayey sandstone. The middle part is largely poorly sorted fine to coarse sandstone with some claystone lenses and galls. The lower part is mostly claystone.

In the Poison Canyon area and in the vicinity of the Marquez mine, the sandstone of the middle part of the Brushy Basin member is usually called Poison Canyon sandstone by local persons. Poison Canyon is about 5 miles due West of the Marquez mine. "Poison Canyon sandstone" has not been accepted as an official stratigraphic name, although it has

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