

NOTES AND NEWS

OBSERVATION OF CLAY MINERALS USING THE ELECTRON MICROSCOPE

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Recently it has been shown that the electron microscope is a very valuable tool of research because of its enormous resolving power, and it opens up a new world, a world of infinitely small objects whose existence could only be surmised with the ordinary microscope.

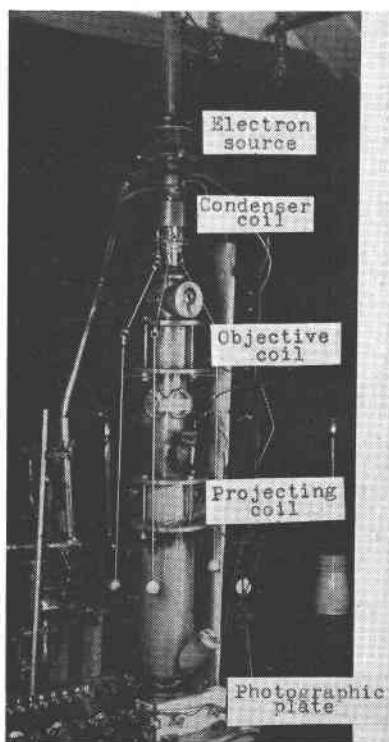


FIG. 1

All of the present methods, such as the use of ultra-violet light or oil immersion, increase the resolving power of the microscope, but even under the most favorable conditions to distinguish between objects separated by less than 0.1 micron is not possible. The writer has constructed an electron microscope and was able to obtain images with a magnifica-

tion of 1000 diameters (maximum magnification of 10,000). Figure 1 shows the general construction of the apparatus.

The electron microscope is similar in principle to the ordinary microscope in which electro-magnetic coils replace the ordinary glass lenses of the latter, and the light source is now replaced by an electron source. The necessary high vacuum is maintained in the microscope by a four stage mercury diffusion pump. The object chamber allows the introduction of specimens into the evacuated microscope and their withdrawal without breaking the vacuum. The specimens to be observed are supported on a thin celluloid film which is made from an amyloacetate solution.

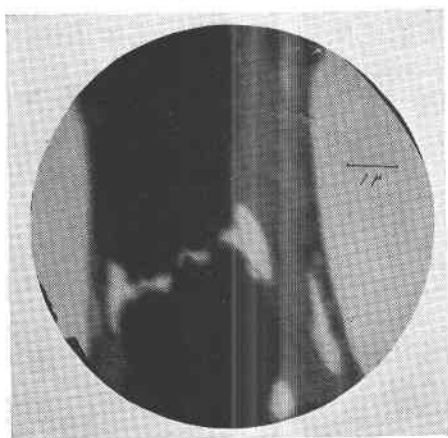


FIG. 2

Kibushi clay is a very plastic ceramic clay in Japan and its chemical composition is similar to that of kaolinite. At the same time, it is a noticeable property that it contains a small quantity of organic material. The appearance of Kibushi clay as observed under the electron microscope is illustrated by Fig. 2. In the illustration, definite crystal forms are not observed but a semi-transparent membrane supporting aggregations of grains may be seen. This membrane is quite different from the celluloid film supporting the specimen, because of its difference in electron transmissibility. The membrane is composed perhaps of organic material which is present in the Kibushi clay. But we cannot determine the character of the membrane from the photograph. In pure kaolinite, definite crystal forms are recognized and the membrane is absent.