NOTE ON THE BECKE REACTION

WILLIAM J. MCCAUGHEY

Ohio State University

The Becke reaction for comparing the index of refraction of a mineral and the material (oil, balsam, or other mineral host) in which it is imbedded, or with which the mineral is in contact, is familiar to most mineralogists.

To obtain this reaction the mineral (generally imbedded in an oil of known index of refraction) is sharply focused. Should the outline of the mineral be rather indefinite, due to the agreement in index of the mineral and the imbedding oil, the condensing lens is removed and the diaphragm in the substage is gradually closed. Upon changing the focus of the microscope by lifting the tube upward, the *Becke line* (a line of light) goes into the substance having the higher index of refraction. On depressing the tube of the microscope, the opposite reaction takes place, *i.e.*, the Becke line goes into the substance having the lower index.

In very finely divided minerals, such as clays, and in minerals which must be finely pulverized, such as the nearly opaque minerals and the fine-grained aggregates, it is difficult to see the Becke line. This line sweeps across a mineral grain, which is quite small in diameter, and then out on the opposite side. It is very difficult in this case to see whether the Becke line went in before it came out, or whether it only came out. In the study of very fine mineral grains, this is always bothersome. In such cases it will be found much easier to use the following reaction:

If the mineral has a higher index than the oil, and the tube of the microscope is raised, a very tiny mineral grain becomes brightly illuminated thruout. If now the tube of the microscope is lowered, the grain becomes dark, or even black. Should the mineral have a lower index of refraction than the oil, when the tube of the microscope is elevated, the tiny grain becomes dark or black directly. This darkening of the mineral grain is easily seen in the grains of a size around 0.005 mm. and is an easy reaction to follow. In larger grains only the edges become dark. This reaction has proven useful in the study of mineral inclusions and of fine grained minerals such as occur in clays. It seems to be quite as sensitive as the Becke reaction is with larger grains.