
THE PETROGRAPHIC CHARACTER OF SOME TOURMALINE AND ZIRCON DETRITALS

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Sandstone samples collected last year from one horizon of the Pennsylvanian beds along the roadside between Shawnee and Calvin, Oklahoma created considerable interest in regard to secondary growths exhibited by some of the tourmaline detritals. The minerals were studied with a magnification of forty-two diameters and with only one nicol prism. The tourmaline grains are well rounded and a few of them appear with a jagged secondary growth. Careful microscopic examination has proved this secondary growth to be authigenic tourmaline.

The secondary growth commonly has a slight tinge of the same color as the parent grain but there is a tendency for it to be nearly colorless. The extinction and position of maximum absorption of the secondary portion has parallel crystallographic orientation identical with that of the tourmaline grain on which it has grown. A faint negative uniaxial interference figure was observed on one fragment which was attached to a basal section of a rounded tourmaline grain. The contact between the well-rounded, darker colored detrital grain and the somewhat clouded character of the secondary material is relatively sharp. The "C" crystallographic axis of some of the grains is parallel to the elongation of the grain while in others it is at right angles to it. However, regardless of the elongation of the grain, the secondary growth is attached at the end of the "C" axis. The secondary material was observed only on one side or on one end of the grain and naturally suggests some possible connection between the polarity of tourmaline structure and that of its enlargement.

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When these grains were found it first was thought that the secondary material was formed under local conditions at that particular place. However as the study progresses it is becoming evident that they are occurring in areas adjacent to this region and that purely local conditions cannot be assigned for their origin. The sharp and fragile character of this material is good evidence that it could not have been attached to the original tourmaline grains before transportation, because it would most likely have been worn and broken off. It must have grown following the deposition of the detritals.

Just what light this secondary growth of tourmaline may throw on the physical and chemical conditions which have existed in these formations is not understood. No attempt has been made at this time to study the phenomenon in detail but it is hoped that an explanation of its origin may be attempted later.

Sandstone samples collected from the Union Dairy member of the Hoxbar Formation outcropping southeast of Ardmore, Oklahoma contain authigenic zircon detritals. The secondary material is attached to the sides of some grains in a saw tooth fashion and seem to be too small for detailed examination. However, their extinction and other optical characters agree with that of the supporting grain. The form (111) can be recognized in some of the larger growths. The angle $111 \wedge 111$ in one example was measured as 94° degrees which approaches very closely that theoretical value of $95^\circ 40'$. The secondary material also exhibited some well developed prism faces (110). One observation was made of a detrital grain lying with its C-axis almost perpendicular to the slide with a portion of the secondary growth approaching a square in which the edges of the pyramid faces (111) appeared faintly as diagonals.

There is little doubt that most of the attached material is secondary since they appear to be too delicate to have survived transportation. This feature perhaps has been greatly overlooked in many residues studied, since these growths are small, scarce and difficult to detect. These zircon detritals seem to be found in only one of a series of samples collected at one place.

Like tourmaline, zircon is an almost invariable accessory mineral in detrital deposits and may survive several erosional cycles. It is, therefore, unwise to generalize until more occurrences of authigenic zircon are studied.
