

Evolution of “Mica Fish” and Similar Structures in Other Minerals, in Mylonitic Rocks

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This study presents a morphological subdivision of mica fish, based on shape and internal cleavage orientation observed in sections perpendicular to the mylonitic foliation and parallel to the stretching lineation.

Based on morphological aspects the relative importance of one of the following formation mechanisms is estimated: rigid body rotation; intracrystalline deformation; recovery; recrystallisation; shape modification by “erosion”, including dissolution and abrasion; deformation partitioning in anastomosing patterns of shear bands. Gradual transitions to S-C structures and to sigma structures are also discussed.

Special attention is paid to possible mechanisms for the peeling off of small fish from larger ones. Although boudinage seems at first sight the most obvious process, evidence in the form of microfolds and kinks indicates that many fish suffer shortening rather than extension along their long axes. Apart from torn off pieces by differential flow of the matrix, an alternative possibility is that tips of micafish are isoclinally folded and then break off along the hinge.

Comparisons are made to similar structures in other minerals, such as hypersthene, diopside, feldspar, kyanite, hornblende, garnet, tourmaline and ore minerals.

The oblique position of the fish with respect to the mylonitic foliation is apparently the result of rotation in non-coaxial flow. The influence of variation in flow-type on the final morphology is discussed on the basis of experimental work.