

TECTONITE

Tectonite is a deformed rock, the fabric of which is due to the systematic movements of the individual units under a common external force.

The rocks that are pervaded by cleavage, foliation and/or lineation are known as tectonites. The tectonites are rocks that have flowed in the solid state in such a way that no part of the rock body escaped the distortional influence of flow, at least, when observed at the scale of single hand specimen and/or outcrop. Tectonites by definition are rocks that have been able to flow in the solid state (Turner and Weiss 1963), but flow is scale dependent. The flow of tectonites is seen microscopically to be a combination of slip, crystallisation, or dissolution along exceedingly closely spaced discontinuities.

Several types of movement planes have been recognised in tectonites. These movement planes are generally described in relationship of three fabric axes and in relation to S-surfaces. The direction of major tectonic transport is denoted by a, b is parallel to fold axes and c is perpendicular to the ab-plane.

Most tectonites, and thus most foliations and lineations, form in environments of elevated temperature and confining pressure. Metamorphic and igneous environments are ideal. However, tectonites also form through distortion of soft sediments, excessively weak lithologies like salt or gypsum, or rock types that are essentially vulnerable to stress induced dissolution.

Types of Tectonite

Several types of tectonites can be distinguished on the basis of whether the tectonite contains foliation, lineation or both. The major types are

S-tectonites

L-tectonites

LS-tectonites

Here L refers to lineation and S refers to foliation.

S-tectonites: Are those which are marked by foliation. But no lineation. The use of letter S is based on the long established convention of employing S-surface in reference to the penetrative, planar, parallel elements that constitute foliation.

The term S-surface is used to denote sets of parallel planes of mechanical inhomogeneity in deformed rocks. S-surface is a descriptive, nongenetic term and includes slip planes, shear planes, cleavage, schistosity, flow banding, original stratification, and so on.

The evaluation of distorted primary objects in tectonites has revealed that S-tectonites tend to be products of flattening, a stage of finite strain in which the magnitudes of finite stretch are such that $S_1=S_2>S_3$. Flattening is the kind of distortion that transforms an original sphere into an oblate strain ellipsoid.

L-tectonites: are tectonites marked by lineation but no foliation.

L-tectonites tend to be products of unidirectional stretching or constriction, a state of strain in which $S_1 > S_2 = S_3$. Constriction transforms an original sphere into a prolate strain ellipsoid.

LS-tectonites: these contain both the lineation and the foliation. These are the most common of all tectonites. Lineation in LS-tectonites lies in the plane of foliation.

LS-tectonites, form through non-coaxial strain, such as plane strain, where stretching in one direction is compensated by flattening at right angles to the direction of stretching, with neither shortening or stretching in the intermediate direction. Simple shear can transform an original sphere into a triaxial ellipsoid in which the state of strain is marked by $S_2 = 1$, and $S_1 > S_2 > S_3$.