



Topotaxial intergrowth and origin of antiperthite in monzogranite

Yueting Song and Shanrong Zhao

China University of Geosciences (Wuhan), School of Earth Sciences, Wuhan, China (songyueting@live.com)

The crystallographic orientation of antiperthite (squared alkali feldspar inclusions grow inside plagioclase host) in Tiantangzai monzogranite from Dabie Mountain was investigated. The morphology of alkali feldspar inclusions is hexahedron, three pairs of parallel faces are controlled by the (010), (001) and (110) planes of the host plagioclase, respectively. Some plagioclase develops albite polysynthetic twin, defined the twinned individuals as Pl(1) and Pl(2), respectively; some alkali feldspar inclusions are related by Carlsbad twin, the twinned individuals are also defined as Kfs(1) and Kfs(2), respectively. Pl(1) is oriented similarly to Kfs(1). The topotaxial relationship between Pl(2) and Kfs(1) is similar to albite-twin. The topotaxial relationship between Kfs(2) and Pl(1) is similar to Carlsbad-twin. Kfs(2) and Pl(2) would form a topotaxial relationship similar to Carlsbad-albite-twin. Pl(1) generally becomes thinner or disappears in the regions where alkali feldspar inclusions developed. The development sequence of the alkali feldspar inclusions and the polysynthetic albite twin needs to be further investigated. Electron microprobe line scanning shows a homogeneous K, Ca and Na distribution in a single plagioclase grain with inclusions developed, suggesting that the origin of alkali feldspar inclusion may not be related to exsolution. The fractures in the host plagioclase are well developed, but most fractures do not pass through the embedded alkali feldspar. The precipitated alkali feldspar may be a result of alkali-bearing fluids penetrating through fractures and replacing plagioclase. The rim of some larger anhedral alkali feldspar inclusions has many voids, the local average misorientation map indicates there is a rectangular area with low misorientation difference inside the anhedral inclusions. The anhedral alkali feldspar inclusions are presumed to form by secondary replacement on top of the original rectangular inclusions.