

Effects of Static Recrystallization on Quartz LPO Patterns From the Ryoke Belt: Implications for the Rheology of the Crust

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Quartz *c*-axis LPO patterns have been widely used to analyze different aspects of mid-crustal ductile deformation. However, despite the common presence of 'annealed' microstructures in high-grade metamorphic belts, the effects of static recrystallization on such quartz LPOs are unclear. A suit of samples of quartz schist from the Nukata area of the Ryoke metamorphic belt collected along profiles of several kilometers that reach the post-orogenic Shinshiro Tonalite shows an increase in grain size and changes in microstructure such as straightening of grain boundaries and formation of quartz-in-quartz inclusion that represent annealing related to contact metamorphism. In contrast to the clear microstructural changes, quartz *c*-axis LPO patterns show only very minor modifications even after strong annealing. This result implies that quartz LPO patterns should not be obliterated by static recrystallization and quartz rich tectonites that lack such LPO patterns deformed by processes other than dislocation creep. Likely processes in high-grade rocks are grain boundary sliding assisted by melt migration and diffusion creep both of which are characterized by Newtonian rheologies.