
220-3 - EFFECT OF MUSCOVITE CONTENT, SHAPE, SPATIAL ARRANGEMENT AND INTERCONNECTIVITY ON QUARTZ RECRYSTALLIZATION PROCESSES



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2:10 PM - 2:25 PM



304C (Anaheim Convention Center)

Abstract

Phyllosilicates, such as muscovite, are prevalent in quartzite mylonites and significantly influence the dynamic recrystallization of quartz. The deformation mechanisms of quartz can shift from grain size-insensitive dislocation creep to grain size-sensitive diffusion creep based on the amount and distribution of phyllosilicates. Phyllosilicates inhibit dynamic recrystallization by grain boundary migration, which hinders grain growth and promotes dissolution creep, dislocation glide in phyllosilicates, and grain boundary sliding in quartz.

To investigate the effect of muscovite on quartz recrystallization processes, we quantify muscovite content, grain shape, spatial arrangement, and interconnectivity in quartzite mylonites from the Miocene detachment shear zone associated with the Raft River metamorphic core complex (NW Utah) using X-ray computed microtomography. Our analyses show variability in muscovite volume fraction (5 to 20%), grain morphology (oblate/platy vs. prolate/bladed grains), and spatial arrangement (isolated grains vs. interconnected network) that correlate with different quartz microstructures.

To explore the impact of muscovite on quartz recrystallization processes, we quantified muscovite content, grain shape, spatial arrangement, and interconnectivity in quartzite mylonites from the Miocene detachment shear zone associated with the Raft River metamorphic core complex in NW Utah using X-ray computed microtomography. Our analyses reveal variations in muscovite volume fraction (ranging from 5 to 20%), grain morphology (oblate/platy versus prolate/bladed grains), and spatial arrangement (isolated grains versus an interconnected network). These variations correlate with distinct quartz microstructures, shedding light on the complex interplay between muscovite and quartz during deformation.

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