Deformation textures of zircon from granitic rocks

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Different post-growth textures have been found in zircon from ductile deformed granitic rocks, such as aplite and porphyritic granite. These textures are suggested to be evidence of crystal-plastic deformation, and complete or partial recrystallization by coupled dissolution-reprecipitation, dissolution and outgrowth formation processes. Recrystallization, dissolution, and outgrowth formation are metasomatic reactions that lead to the chemical, textural and structural alteration of zircon, were fluid-induced, and are characteristic for zircon from granitic rocks. These reactions should result in complete re-equilibration of the initial U/Pb isotopic system in zircon. We suggest that zircon from granitic rocks is more subjected to the aggressive fluids due to its high initial reactivity, and high trace element abundances that can cause metamictization, and/or internal strain in the lattice.

As a result of a micro-structural study by BSE, CL and EBSD imaging, and based on crosscutting and overlapping relationships of post-growth textures in zircon, the sequence of metamorphic events can be reconstructed. These include metamictization, metasomatic recrystallization, dissolution, mineral-fluid reactions, and overgrowth, in some cases followed by ductile deformation (Fig. 1).

Zircon secondary textures are important for understanding tectonic processes, chemical processes such as mineral reactions, and fluid-rock interactions. As such they can be critical for geochronological dating of metasomatic and deformation events.

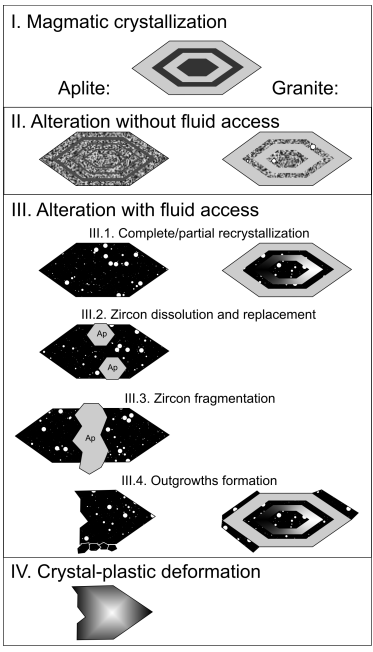

Figure 1. Zircon evolutionary stages in deformed granitic rocks.