Abstract

This thesis is focused on developing simulation of Ostwald ripening. Ostwald ripening is a static process (stress is not applied), which essentially changes the texture of rocks. This process causes a redistribution of mass from the small crystals to the larger ones, which causes growth of the big crystals and dissolution of the smaller ones. This process happens in order to decrease bulk surface energy of the system. During Ostwald ripening, the texture starts to be progressively more fine-grained, and the overprinting of the original textural record occurs.

The simplified simulation of magmatic crystallization was made for the purpose of creation of realistic original texture. After that, the simulation of Ostwald ripening, where the ripening can be applied on generated texture, was developed. Moreover, programs for processing data and for digitalization of texture of real rocks samples, which were supposed to be used for comparison with the data from the simulation, were created. The evolution of CSD curves of simulated textures meet the theoretical predictions, from log-linear to concave shape (mostly in area of small crystals), which indicates the depletion of small crystals. The time evolution of mean sizes of crystals follows the power-law. However, it was found out that the time scales of the simulation are not fully realistic. The concentration of equilibrated triple-points in the texture is increasing quickly at the beginning of the simulation, but starts to slow down later and stabilizes on the value of 20 %. Furthermore, it was found out that the real texture doesn't show any signs of significant depletion of small crystals, which could have been caused by dynamic recrystallization, which unlike Ostwald ripening causes the breakdown of big crystals to the smaller ones.