

## Accepted Manuscript

Quantitative investigation of felsic rock textures using cathodoluminescence images and other techniques

Michael Denis Higgins

PII: S0024-4937(16)30083-4  
DOI: doi: [10.1016/j.lithos.2016.05.006](https://doi.org/10.1016/j.lithos.2016.05.006)  
Reference: LITHOS 3924

To appear in: *LITHOS*

Received date: 26 February 2016  
Revised date: 6 May 2016  
Accepted date: 10 May 2016



Please cite this article as: Higgins, Michael Denis, Quantitative investigation of felsic rock textures using cathodoluminescence images and other techniques, *LITHOS* (2016), doi: [10.1016/j.lithos.2016.05.006](https://doi.org/10.1016/j.lithos.2016.05.006)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Quantitative investigation of felsic rock textures using cathodoluminescence images and other techniques

Higgins, Michael Denis, Sciences de la Terre, Université du Québec à Chicoutimi,  
555 boulevard de l'université, Chicoutimi, Québec, G7H 2B1, Canada.

### Abstract

The qualitative and quantitative study of the textures (microstructures) of felsic rocks has been somewhat neglected, as compared to mafic rocks. This is partly because the major phases are all colourless with similar birefringence. This problem has been addressed using cold-cathode cathodoluminescence (CL). This microscope-based method easily distinguishes quartz, K-feldspar and plagioclase, and can also identify zoning and other structures. A combination of CL and cross-polarised light images can be used to trace the outlines of most crystals in a thin section. These techniques have been applied to a dacite and three granitoids in order to understand the process of solidification. In three of the rocks macrocrysts or oikocrysts have sealed in textures whilst the rock was partially solid. These data are used to construct diagrams illustrating possible paths of phase abundance, crystal sizes and temperature during solidification. In all four rocks the saturation order appears to be amphibole+/- biotite+apatite : plagioclase : K-feldspar : quartz. Plagioclase initially crystallises in a regime of increasing undercooling to give a kinetic texture. It is generally coarsened after K-feldspar has saturated. K-feldspar saturated and then immediately started to coarsen in three of the rocks. Competition between growth of orthoclase and plagioclase may determine if macrocrysts or oikocrysts are formed. Quartz is the last phase to saturate and was coarsened in some rocks. The overall rock texture is therefore controlled by a combination of compositional effects on saturation temperatures, such as volatile content, and cooling path. The solidification paths determined here are not unique, but do show what can be achieved from a textural study, with no knowledge of the volatile content of the magma.

Download English Version:

<https://daneshyari.com/en/article/5784091>

Download Persian Version:

<https://daneshyari.com/article/5784091>

[Daneshyari.com](https://daneshyari.com)