American Mineralogist, Volume 90, pages 737–744, 2005

XRMapAnal: A program for analysis of quantitative X-ray maps

DOUGLAS K. TINKHAM* AND EDWARD D. GHENT

Department of Geology and Geophysics, University of Calgary, Calgary, AB T2N 1N4, Canada

ABSTRACT

Software for processing quantitative X-ray maps collected on an electron probe microanalyzer is described. The techniques used in collection of maps and capabilities of the software to produce data useful for petrologic analysis are illustrated using three examples from pelitic schists from Mica Creek, British Columbia. The program utilizes a Bence-Albee algorithm to convert raw X-ray counts at each map pixel to wt% oxide, and allows for spectrometer deadtime corrections and background subtraction. Additional features include phase identification, modal analysis, calculation of cations, calculation of integrated rock composition over specified regions of the map, display of maps and compositional graphs, output of compositional statistics, and the ability to remove pixels and screen for bad analyses.

The first example utilizes a sample lacking phases with significant chemical zonation, and outlines the basic functionality of the program. The second example compares an integrated map composition to an X-ray fluorescence analysis on the same rock chip. The results indicate it is possible to obtain integrated map compositions approaching that obtained from an X-ray fluorescence analysis. The third example compares mean X-ray map compositions for individual phases to means obtained using routine point analysis procedures, and the results indicate mean phase compositions obtained from the X-ray maps are of generally high quality. The sample in this example contains compositionally zoned garnet, and is used to show the ability to remove selective portions of garnet to model the approximate change in effective bulk composition during garnet growth.