

EMPA Analytical Conditions for Feldspar Samples Analyzed on June 9, 2017

Instrument Model and Electron Beam

Compositional analyses were performed on a JEOL JXA-8900R electron microprobe at the Department of Earth Sciences, University of Minnesota. Electron beam operating conditions were an accelerating voltage of 15 kV and a beam current of 80 nA.

WDS Crystals, Emission Lines, and Oxygen Determination

Elements were acquired using analyzing crystals LiF (for Fe α and Ba λ), PETJ (for K α , Ca α , P α , and Sr λ), PETH (for Rb λ and Cs λ), and TAP (for Na α , Al α , and Si α). Oxygen was calculated by cation stoichiometry and included in the matrix correction.

Element Standards

Standards utilized were Anorthite, NMNH 137041 (for Al α and Ca α); Fluorapatite, NMNH 104021 (for P α); Benitoite, NMNH 86539 (for Ba λ); Hornblende (Kakanui), NMNH 143965 (for Fe α); Pollucite (for Cs λ); Orthoclase, Taylor, KAlSi_3O_8 (for K α and Si α); RbBr (for Rb λ); Albite, Taylor, $\text{NaAlSi}_3\text{O}_8$ (for Na α); and Strontium Titanate, MAC, SrTiO_3 (for Sr λ).

Element Counting Times and Background Fitting

The on peak counting time was 20 seconds for Si α , Al α , Ca α , K α , and Na α ; 30 seconds for Fe α ; 80 seconds for Rb λ , Cs λ , and P α ; 90 seconds for Sr λ ; and 150 seconds for Ba λ . The off peak counting time was 20 seconds for Si α , Al α , Ca α , K α , and Na α ; 30 seconds for Fe α ; 160 seconds for Rb λ , Cs λ , and P α ; 180 seconds for Sr λ ; and 300 seconds for Ba λ .

A linear background fit was used for Si α , Al α , Ca α , Fe α , K α , Na α , and P α . An exponential background fit was used for Rb λ , Cs λ , Ba λ , and Sr λ . For more details, please see: Donovan, J., Lowers, H., and Rusk, B. (2011). Improved electron probe microanalysis of trace elements in quartz, *American Mineralogist*, **96**, pp. 274-282.

Correction Methods

Unknown and standard intensities were corrected for deadtime. Standard intensities were also corrected for standard drift over time.

The matrix correction method used was Armstrong/Love Scott (CitZAF) and the mass absorption coefficients dataset was FFAST (Chantler; NIST v 2.1, 2005). For more details, please see: Armstrong, J., (1988). Quantitative analysis of silicates and oxide minerals: comparison of Monte-Carlo, ZAF and $\phi(\rho z)$ procedures, *In* Newbury, D. (Ed.) *Microbeam Analysis—1988*, (pp. 239-246). San Francisco, CA: San Francisco Press, Inc.

Current ZAF or $\phi(\rho z)$ Selection:

Armstrong/Love Scott (default)

Correction Selections:

- $\phi(\rho z)$ Absorption of Armstrong/Packwood-Brown 1981 MAS
- Stopping Power of Love-Scott
- Backscatter Coefficient of Love-Scott
- Backscatter of Love-Scott
- Mean Ionization of Berger-Seltzer
- $\phi(\rho z)$ Equation of Love-Scott
- Reed/JTA w/ M-Line Correction and JTA Intensity Mod.
- Fluorescence by Beta Lines Included
- FFAST Chantler (NIST v 2.1, 2005)