Probe Software

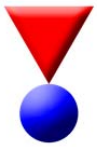
Software for MicroAnalysis

Probe for EPMA

Probe Image

PictureSnapApp

Probe Software, Inc.
885 Crest Drive
Eugene, OR 97405 USA
(541) 343-3400
sales@probesoftware.com
www.probesoftware.com



Probe for EPMA Purchase Justification

See below (page 4) for detailed information on these latest developments in Probe for EPMA:

- **Quantitative Matrix Iterated "blank" Correction for Improved Trace Element Accuracy**
- **Multi-Point Backgrounds with Statistics Based Modeling**
- **"Shared" Backgrounds for Elements Acquired with the Same Spectrometer and Crystal**
- **High Speed Monte-Carlo Calculation of Low Voltage and Low Overvoltage Matrix Corrections**
- **Fast Modeling and Correction of Secondary Fluorescence from Boundaries**
- **Automatic full spectrum CL acquisition, storage and export**
- **Quantitative Correction of Time Dependent Intensity (TDI) Effects for Beam Sensitive Materials in Points and Maps**

Selected unique features not offered by any other microanalysis package:

- **Full TCP/IP network communication with JEOL 8900/8200/8500/8230/8530 and Cameca SX100/SXFIVE instruments for all stage, column, WDS spectrometer and imaging/mapping functions.**

  - TCP/IP network interfacing means that all instrument function control occurs through the instrument's private LAN, with *no changes* to your existing OEM software or instrument configuration. Both your existing OEM software and Probe Software can simultaneously run and connect to your instrument *at the same time* with no conflicts whatsoever, from separate computers.

  - Probe Software utilizes an integrated approach to electron microprobe analysis that is designed and continuously improved by a large community of EPMA users around the world. We focus on high quality, robust, flexible and easy to use software and respond quickly to our customers' quantitative analysis and imaging/mapping requirements.

- **Data file formats used by Probe Software are industry standard relational database formats based on Microsoft Access. All data (unknown, standard and wavescan intensities, instrument conditions digitized coordinates, images, EDS spectra, peaking and PHA scans) are automatically saved to the user's currently open database file and all data can be easily exported to text or Excel formats.**

  - As a completely integrated application, Probe for EPMA is uniquely able to provide automatic recording and saving of all experimental conditions and measurements by retaining ALL data and parameters for documentation and subsequent data evaluation purposes in a non-proprietary file format. **There is no "Save" button to forget to click!** Probe Software makes a special effort to provide display or output of EVERY piece of raw data, instrumental parameters and correction factors when specified by the user.

  - In addition, all components of the integrated software system communicate intelligently and will anticipate the user's acquisition and automation goals. For example, after automatically scanning the elemental peak regions, one can adjust the off-peak positions by simply clicking the plotted data. The newly selected off-peak positions are then automatically utilized for subsequent acquisitions.

  - Automatically records all PHA, bias and gain scans along with all instrument conditions. Records all peaking (interval halving, parabolic and ROM based "continuous" method) data automatically for future reference and export. Records all instrument conditions for images and EDS spectra including stage

coordinates and column conditions. All data is automatically date/time tagged for documentation purposes.

- **Unlimited site license for copying Probe for EPMA to off-line computers for reprocessing of analytical data. Every Probe for EPMA user gets a free copy of the software for off-line analysis and processing! Realistic Demo Mode for fast user training using the Probe for EPMA acquisition and analysis software.**

  - Probe Software provides an unlimited site license for re-processing of data, modeling of x-ray and electron ranges, detection limits, x-ray database manipulations and many other sophisticated data analysis options. Each EPMA user can take a copy of Probe software with them for their own off-line data re-processing.

- **On-line, context sensitive HyperText linked help Files (~ 600 pages) with search and bookmark and print capability , *plus* a new on-line Wizard for fast and easy new user training.**

  - Probe for EPMA is completely documented from several perspectives. The Reference Manual describes what every component does in detail and the User Guides describes how to perform every analytical procedure using a mouse click by mouse click description, while the tool-tip help feature provides a quick and handy mini popup reference for every control. In addition, a new Quick Start Manual provides a handy reference for training new users and getting them proficient quickly.

- **Unique graphic display of live acquisition progress showing spectrometer acquisition times for each spectrometer and element for useful visual feedback of ongoing acquisitions.**

  - This graphical acquisition progress display is automatically updated for all standard, unknown and wavelength scan acquisitions. Automated acquisitions display *accurate* predicted time to completion.

- **Quantitative spectral interference correction for both major and trace element analysis using a matrix corrected and iterated method that is rigorously accurate even for extreme overlap situations.**

  - Only Probe Software offers a fully quantitative interference correction that provides high accuracy results by applying a full matrix correction for the intensity from the interference standard. This means that even trace elements with large overlaps can be successfully extracted from your measurements. This capability is implemented rigorously but requires only two mouse clicks to specify. Simply select the element causing the interference and select a standard for the interference correction and you are done.

- **Automatic standard drift correction in real time using linear interpolation for standard, interference and MAN background intensities for long duration runs with up to 40 re-standardizations per run.**

  - The automatic drift correction means that any instrumental intensity drift on even extended runs can achieve high accuracy on ALL samples by simply restandardizing occasionally . This standard intensity drift correction is in addition to the beam drift correction and is applied on an element by element basis. By interpolating between standardizations, the program is able to correct intermediate analyses on unknowns for linear drift so that all data is accurately calculated.

- **Automated iterated polynomial fit Mean Atomic Number (MAN) background correction for fast and accurate major and minor element analysis.**

  - The mean atomic number background correction can halve your analysis time while retaining full accuracy on major and even minor elements down to several hundred ppm. Accuracy is further improved because off-peak interferences are no longer an issue. In addition to the time savings, spectrometer wear and tear is reduced.

- **Source code available (Non Disclosure Agreement required). Remote automation (active-X) interface available for custom macro control of instrument from any OLE container (Word, Excel, etc).**

- All algorithms and calculations are published and available as peer reviewed papers and source code. Macro capability is provided through a high level Active-X interface using Excel. Examples are provided and documentation supplied showing how anyone can write their own automation and acquisition code for special scientific purposes or instrument calibration and testing.

- **Integrated COMPOUND Area-Peak-Factor (APF) correction for accurate light element analysis based on the actual composition of the sample.**

  - A sophisticated peak shape correction is provided to easily correct light elements for peak shape distortion due to chemical bonding. Simply select a correction factor based on the analyzed light element and the matrix element using a single mouse click. The compound APF is automatically calculated and applied in an iterative fashion during the normal matrix calculation.

- **Quantitative graphical Time Dependent Intensity (TDI) "volatile" element correction for any or all elements using both calibration reference or internally referenced "self" calibrations with linear or quadratic extrapolation to zero time.**

  - The TDI element correction is an essential feature to correct for any element whose intensity varies in time. Graphically display all intensity changes, while the program automatically calculates the zero time intensity and adjusts the matrix correction for the change in composition. Turn the correction on or off with a single mouse click.

- **Integrated imaging for BSE, SE and CL with automatic display of analyzed positions. Unique "PictureSnap" feature for import of optically scanned sample images with live current position cursor, mouse click navigation and display of digitized or analyzed sample positions on the analog or optical image.**

  - Easily navigate optically scanned sample images using a quick and easy two point coordinate transformation (or three points for round samples subject to rotation). Display digitized coordinates for automated acquisitions, and afterwards display the acquired coordinates on the optically scanned image even off-line during data re-reprocessing. Both a zoom window and full size image window are provided for quickly moving around the sample.

- **3-D Coordinate transformation import for unknown, wavescan and standard digitized data from ASCII files (including off-line microscope stages).**

  - All samples, including standards and unknowns can be referenced to physical fiducial marks on the sample mount for transformation to other instrument stage coordinate systems or for subsequent re-loading in the EPMA. This feature ensures that you can always re-locate areas of interest even in fine-grained and complicated samples.

- **Graphical background modeling with linear, average, high only, low only, exponential (user defined), slope and polynomial fit options.**

  - Numerous background fitting options are provided for accurate trace element analysis. Even highly curved backgrounds can be accurately fit using the exponential background to allow you to use the full range of your spectrometers at trace concentration levels.

- **X-ray and electron range modeling. Calculate detection limits for given conditions or conditions for given detection limit. Single layer thin film and particle quantitative analysis (based on Armstrong code).**

  - Many modeling capabilities are provided along with a fully quantitative particle correction capability based on work by John Armstrong using a variety of particle shapes and sizes.

- **Full spectrum integration of WDS/EDS including storage of complete EDS spectrum and detector and analysis parameters, quantitative post processing of EDS analyses, spectrum display and export.**

- Automatically acquire and store a full EDS spectrum for every WDS analysis. Easily browse each EDS spectrum within Probe for EPMA using integrated KLM markers to check for sample charging or missing elements and add them to the WDS quantification using a fully quantitative k-ratio treatment.

- Supports Thermo NSS and Bruker Esprit EDS spectrum. Other EDS system integrations available on request. EMSA format and NIST "raw" spectrum image format export options included.

- **A fully quantitative matrix iterated "blank" correction for super accurate trace element analyses in the low PPM ranges.**

  - This new feature allows the user to specify a measured zero or non-zero blank sample to provide a quantitative adjustment to the unknown intensities to correct for systematic errors due to asymmetrical crystal diffraction. Provides a significant improvement in trace element accuracy at low PPM levels.

- **Multi-Point Backgrounds**
  - Our new multi-point background acquisition allows the program to automatically acquire a number of off-peak intensities distributed on each side of the analytical peak (which can be specified precisely by the user) to avoid unpredicted off-peak interferences from other elements.
  - This process is automatically performed iteratively when the background correction is calculated by optimizing a fit based on removing background points with the highest variances above the fitted background until a specified number of valid background positions is reached.

- **"Shared" Backgrounds**
  - Using the above described multi-point background arrays, the user can simply click the "Search For "Shared" Backgrounds button to automatically load element background intensities for elements acquired using the same spectrometer and crystal. This new method allows for much better control of the background modeling in situations where the background is complex (e.g., multiple REEs).

- **High Speed Monte-Carlo Calculation of Low Voltage and Low Overvoltage Matrix Corrections**

  - By implementing pre-calculated compositional binaries using Penepma/Penelope mote-carlo runs at high precision, we can provide accurate matrix corrections for many situations that are problematic for traditional analytical expressions.

- **Fast Modeling and Correction of Secondary Fluorescence from Boundaries**

  - A recent cutting edge development is two fold: first the ability to quickly model secondary fluorescence effects from boundary phases to see if a problem exists for a given pair of materials and specified measurement conditions (keV, x-ray, distance, etc), and second, a new matrix iterated quantitative correction for these boundary artifacts for actual measurements in real time!

- **Additional X-Ray lines supported for Acquisition and Quantitative Analysis**

  - Probe for EPMA now fully supports acquisition and quantitative analsis for additional x-ray lines, specifically the Ln, Lg, Lv, Ll, Mg and Mz emission lines. Although these emission lines are of lower intensity than the main alpha and beta series lines, they are not affcted by chemical states, thus providing betetr quantification for transition metals at very low beam energies, e.g., 5 keV.

- **New "Fast" Monte-Carlo Quantification for the "state of the art" in Matrix Corrections**

  - Probe for EPMA has implemented an advanced high accuracy, "fast" Monte-Carlo quantification method for bulk matrix corrections. Your quantitative analyses will benefit from this easy to use GUI implementation of the trused Penelope Monte-Carlo physics package.

- **New Full Spectrum CL Acquisition, Storage and Exporting**

  - Full spectrum CL acquisition for all standard, unknown and wavescan samples using your existing or new Ocean Optics spectrometers (other CL vendors supported on request). Document sub PPM trace elements along with WDS and EDS full spectrum acquisitions.

- **New TDI Scanning Feature for Quantitative X-ray Mapping of Beam Sensitive Materials**

  - By utilizing replicate x-ray scans, Probe for EPMA can not only quantitatively correct for intensity changes over time due to ion migration in x-ray maps, but also correct for carbon contamination effects for accurate trace carbon determinations.

- **Many other unique capabilities too numerous to mention in detail are integrated in the Probe for EPMA software system. For example, just a few of them:**

  - Automatic subtraction of oxygen equivalent for halogens from the stoichiometric oxygen for significantly improved matrix corrections (e.g, fluorine bearing silicates). Also automatic calculation of excess oxygen from measured oxygen in oxides or silicates for calculation of water by hydrogen stoichiometry to excess oxygen.

  - Virtual standard intensity calculations for analyzing elements without a standard (e.g., Ar in minerals).

  - Random and digitized cluster coordinate digitizing for unbiased evaluation of sample homogeneity.

  - Wavelength scan zoomable graphical display with c*omplete* NIST based KLM line markers (including up to 20th order lines).

  - Live display of sample, standard and wavescan acquisition progress. Accurate estimation of total projected acquisition time for automated samples.

  - Unique option to display only the statistically significant digits in analysis results. If the concentration is below the 99% confidence detection limit, an “n.d.” is printed. Automatic report generation of English sentences describing the sample and instrument experimental conditions.

  - Easily utilize empirical Mass Absorption Coefficients or values from the scientific literature and override default values for quantitative calculations. Empirical MACs are saved automatically for future use.

  - Aggregate intensity option for acquiring trace elements on multiple spectrometers with quantitative propagation of counting statistics for improved sensitivity.

  - Automatic sorting into traditional geological order (SiO2, TiO2, Al2O3, etc) for both Excel output and copy and paste operations.

  - Combine arbitrary samples for average, standard deviation and other statistical calculations and data processing operations.

  - Automatic update menu for obtaining the latest Probe for EPMA software updates with a single mouse click.

  - Smart “Nth Point” off-peak backgrounds which monitor a user specified element intensity to automatically re-measure the off-peak backgrounds based on a user specified interval and also a percent intensity change tolerance.

  - Automatic sorting of elemental output by traditional geological order or ascending or descending atomic number order.

- Integrated intensity acquisition options for acquisition of full peak intensities for quantitative analysis when peak shift or shape issues are present. Automatically utilized user selected background fitting options with interactive display of both integrated intensities and backgrou8nd fitting. Utilizes either ROM based “continuous” scanning or “variable step” scanning for optimized acquisition time.

- Automatically list all anomalous intensity data for standard and/or unknown samples based on rigorous statistical criteria.

- Graphical interface for Penelope (Penepma) Monte-Carlo calculations for calculating secondary fluorescence across compositional phase boundaries.

- Automated monazite geochronological age calculations based on Montel, Hanchar and Allaz U, Th, Pb compositions. Automatic output to Excel.

- **Special modifications and new algorithms are our specialty. Probe Software provides access to a large community of expert users who really care about high quality EPMA analyses.**

  - If you have an idea how to improve the software or a special analytical need we’d like to hear about it. Because all we do is EPMA software.

  Contact: John Donovan, donovan@probesoftware.com or call (541) 343-3400 for more information.