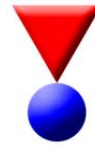


# Probe Software

Software for MicroAnalysis

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## Probe for EPMA

## Probe Image

### Correction for Secondary Boundary Fluorescence from Nearby Phases

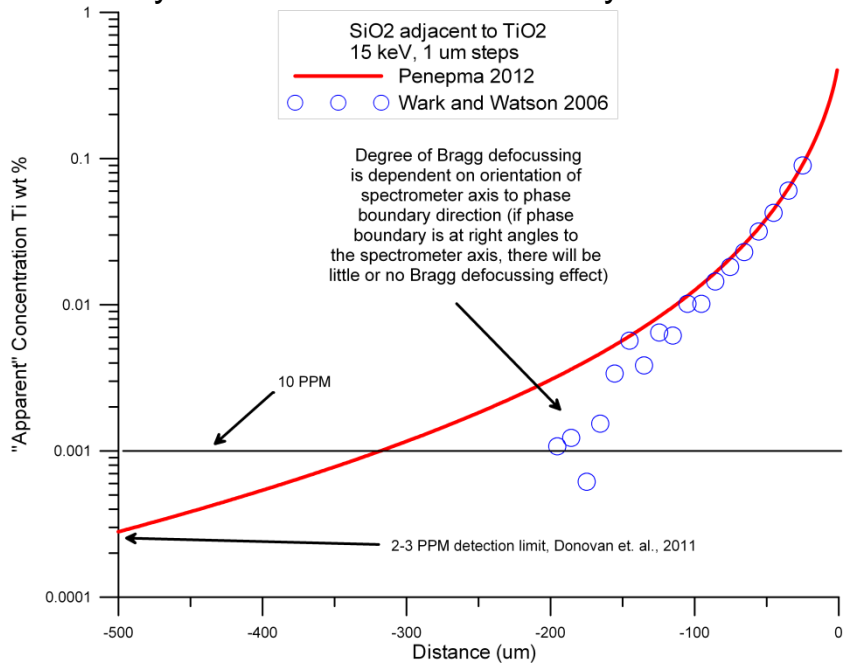
Probe Software announces a new feature for the correction of secondary fluorescence boundary effects from nearby phases containing the element of interest that is detected by WDS or EDS spectrometers.

This boundary fluorescence effect is generally of concern for trace element analysis, but at distances less than tens of microns from phase boundaries, it can be a percent level artifact for some element couples, such as Cu-Co, Ni-Fe, Cr-W, etc.

Correction of these boundary fluorescence effects is possible through recent efforts by Francesco Salvat and Xavier Llovet at the University of Barcelona, Spain.

Starting with the development of sophisticated monte-carlo models for electron-photon fluorescence effects, followed by new work implementing these insights into analytical expressions, means that these once time consuming and tedious operations can now be performed in a fraction of the time previously required for high precision quantitative calculations.

Probe Software has implemented these newly developed boundary fluorescence calculations in our CalcZAF acquisition and analysis software for the automatic correction of boundary effects in real-time based on the actual spatial distances and analyzed compositions.



Calculate Penepma 2012 Fluorescence Couple Profiles

PENEPMA Material Files (create MAT files)

Select Material A (beam incident material) | Select Material B (boundary material) | Select Material B Std (primary standard)

Material A (beam incident) | Material B (boundary) | Material B Std (primary std)

Element | Co | X-Ray | 15 keV | 15 | 50 | 50 | Copy To Clipboard

Run Fanal (generate k ratio file for couple profile) | Send To Excel | Use Grid Lines | Use Log Scale | Zoom Full

Co Kα, in Cu adjacent to Co (15 keV, Co std)

K-Ratio % of Co wt %

Distance um

K-Ratio %

● Calc. Wt. % (Ideal)

● Boundary Wt. % (from Mat B)

● CalcZAF Wt. % (Armstrong/Love/Scott (default))

Primary Intensity Calculations (create PAR files for one or all MAT files) [10 files each at 3600 sec]

Create Material Files in PENEPMA\_Path

Run Penepma and Fanal for ALL these materials (generate PAR files)

Run Penepma/Fanl for Material A Only

Run Penepma/Fanl for Material B Only

Run Penepma/Fanl for Material B Std Only

K-ratio Calculations Completed

Penepma was written by Francesco Salvat, José M. Fernández Varela, Josep Sempau, Facultat de Física (EDM), Universitat de Barcelona, Spain. © IREC D. 2009. IAEA No. 0222. NUCLEAR ENERGY AGENCY ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT. Penepma was written by Francesco Salvat and Xavier Llovet, Universitat de Barcelona, Spain.

Further corrections for Bragg defocussing effects which can vary from negligible to significant depending on the analyzing crystal resolution and orientation of the WDS spectrometer and direction of the fluorescing phase boundary are currently being implemented.

These secondary boundary fluorescence artifacts can also be modeled and corrected "off-line", using our new Penepma 2012 GUI feature in CalcZAF which can be downloaded for free from our web site.

<http://www.probesoftware.com/Technical.htm>