

Quantitative Electron Microprobe Analysis

Wavelength Dispersive X-ray Spectrometry (WDS)

Goal: Measurement of concentration
of elements in a microscopic volume

Quantitative Electron Microprobe Analy

Roger Theisen



Quantitative Electron Microprobe Analysis:

Quantitative Electron Microprobe Analysis Roger Theisen, 2013-11-11 Electron Probe Quantitation K.F.J. Heinrich, D. Newbury, 1991-06-30 In 1968 the National Bureau of Standards NBS published Special Publication 298 Quantitative Electron Probe Microanalysis which contained proceedings of a seminar held on the subject at NBS in the summer of 1967 This publication received wide interest that continued through the years far beyond expectations The present volume also the result of a gathering of international experts in 1988 at NBS now the National Institute of Standards and Technology NIST is intended to fulfill the same purpose After years of substantial agreement on the procedures of analysis and data evaluation several sharply differentiated approaches have developed These are described in this publication with all the details required for practical application Neither the editors nor NIST wish to endorse any single approach Rather we hope that their exposition will stimulate the dialogue which is a prerequisite for technical progress Additionally it is expected that those active in research in electron probe microanalysis will appreciate more clearly the areas in which further investigations are warranted **Quantitative Electron Microprobe Analysis** James Harold Moss, 1970 *FRAME* Harvey Yakowitz, Robert L. Myklebust, Kurt F. J. Heinrich, 1973 **Quantitative Electron Probe Microanalysis** Kurt F. J. Heinrich, 1968

Qualitative and Quantitative Electron-microprobe Analysis, 1988 Electron Microprobe Analysis and Scanning Electron Microscopy in Geology S. J. B. Reed, 2005-08-25 Originally published in 2005 this book covers the closely related techniques of electron microprobe analysis EMPA and scanning electron microscopy SEM specifically from a geological viewpoint Topics discussed include principles of electron target interactions electron beam instrumentation X ray spectrometry general principles of SEM image formation production of X ray maps showing elemental distributions procedures for qualitative and quantitative X ray analysis both energy dispersive and wavelength dispersive the use of both true electron microprobes and SEMs fitted with X ray spectrometers and practical matters such as sample preparation and treatment of results Throughout there is an emphasis on geological aspects not mentioned in similar books aimed at a more general readership The book avoids unnecessary technical detail in order to be easily accessible and forms a comprehensive text on EMPA and SEM for geological postgraduate and postdoctoral researchers as well as those working in industrial laboratories *Fourth National Conference on Electron Microprobe Analysis*, 1969 **Electron Probe Microanalysis** A. J. Tousimis, L. Marton, 2013-11-06 Electron Probe Microanalysis presents a collection of reviews on various aspects of electron probe microanalysis This book discusses the model for quantitative electron probe analysis Organized into 14 chapters this book begins with an overview of the various kinds of microanalysis followed by a discussion of the advantages that can be derived from using the electron probe method This text then examines the various applications of backscattered electron and specimen current methods for quantitative analysis Other chapters consider the fundamental concepts for quantitative electron probe microanalysis utilizing pure elements as standards This book discusses as well the absolute method of

quantitative chemical analysis by emission X ray spectroscopy The final chapter deals with the main advantage of the Kossel technique in the study of the thermodynamic and mechanical characteristics of crystals This book is a valuable resource for scientists and research workers Non specialists who need information on this excellent analytical tool will also find this book useful Quantitative Electron-probe Microanalysis Victor D. Scott,Glyn Love,1983 *Electron Probe Quantitation* K.F.J. Heinrich,D. Newbury,2013-06-29 In 1968 the National Bureau of Standards NBS published Special Publication 298 Quantitative Electron Probe Microanalysis which contained proceedings of a seminar held on the subject at NBS in the summer of 1967 This publication received wide interest that continued through the years far beyond expectations The present volume also the result of a gathering of international experts in 1988 at NBS now the National Institute of Standards and Technology NIST is intended to fulfill the same purpose After years of substantial agreement on the procedures of analysis and data evaluation several sharply differentiated approaches have developed These are described in this publication with all the details required for practical application Neither the editors nor NIST wish to endorse any single approach Rather we hope that their exposition will stimulate the dialogue which is a prerequisite for technical progress Additionally it is expected that those active in research in electron probe microanalysis will appreciate more clearly the areas in which further investigations are warranted Electron Probe Microanalysis Karl Zierold,Herbert K. Hagler,2013-03-08 The aim of electron probe microanalysis of biological systems is to identify localize and quantify elements mass and water in cells and tissues The method is based on the idea that all electrons and photons emerging from an electron beam irradiated specimen contain information on its structure and composition In particular energy spectroscopy of X rays and electrons after interaction of the electron beam with the specimen is used for this purpose However the application of this method in biology and medicine has to overcome three specific problems 1 The principle constituent of most cell samples is water Since liquid water is not compatible with vacuum conditions in the electron microscope specimens have to be prepared without disturbing the other components in particular diffusible ions elements 2 Electron probe microanalysis provides physical data on either dry specimens or fully hydrated frozen specimens This data usually has to be converted into quantitative data meaningful to the cell biologist or physiologist 3 Cells and tissues are not static but dynamic systems Thus for example microanalysis of physiological processes requires sampling techniques which are adapted to address specific biological or medical questions During recent years remarkable progress has been made to overcome these problems Cryopreparation image analysis and electron energy loss spectroscopy are key areas which have solved some problems and offer promise for future improvements Present State of the Classical Theory of Quantitative Electron Probe Microanalysis Kurt F. J. Heinrich,1970 Although the foundations for a procedure of data reduction in quantitative electron probe analysis have not been changed for several years there has been progress in the choice of expressions parameters and constants A brief account of recommended expressions and procedures is given Reference is made to the Standard Reference Materials of Au

Ag and Au Cu alloys issued for electron probe microanalysis These are especially useful for investigating the application of correction procedures A Rigorous Correction Procedure for Quantitative Electron Probe Microanalysis (COR 2) Jean

Hénoc, Kurt F. J. Heinrich, Robert L. Myklebust, 1973 *Microprobe Techniques in the Earth Sciences* Philip J. Potts, J.F.

Bowles, Stephen. J. Reed, R. Cave, 2012-12-06 30% discount for members of The Mineralogical Society of Britain and Ireland

This text covers the range of microanalytical techniques available for the analysis of geological samples principally in research applications Each chapter is written in a clear informative style and has a tutorial element designed to introduce each technique for the beginning and experienced researcher alike **Biomedical Applications of Microprobe Analysis**

Peter Ingram, John D. Shelburne, Victor L. Roggli, Ann LeFurgey, 1999-10-29 Biomedical Applications of Microprobe Analysis is a combination reference laboratory manual for the use of microprobe analysis in both clinical diagnostic and research settings Also called microchemical microscopy microprobe analysis uses high energy bombardment of cells and tissue in combination with high resolution EM or confocal microscopy to provide a profile of the ion metal and mineral concentrations present in a sample This allows insight into the physiology and pathophysiology of a wide variety of cells and tissues This book describes methods for obtaining detailed information about the identity and composition of particles too small to be seen with the naked eye and describes how this information can be useful in diagnostic and biomedical research Up to date review of electron microprobe analysis Detailed descriptions of sample preparation techniques Recent technologies including confocal microscopy infrared microspectroscopy and laser raman spectroscopy Over 100 illustrations with numerous specific applications Contributions by world renowned experts in the field Brief summary of highlights precedes each chapter

Electron Beam Microanalysis , Quantitative Electron Microprobe Analysis of Airborne Particulate Material John Thomas Armstrong, 1978 **NBS Special Publication** , 1976 **Methods and Instrumentations: Results and Recent Developments** Arnold S. Marfunin, 2013-03-09 All existing introductory reviews of mineralogy are written according to the same algorithm sometimes called the Dana System of Mineralogy Even modern advanced handbooks which are certainly necessary include basic data on minerals and are essentially descriptive When basic information on the chemistry structure optical and physical properties distinguished features and paragenesis of 200 400 minerals is presented then there is practically no further space available to include new ideas and concepts based on recent mineral studies A possible solution to this dilemma would be to present a book beginning where introductory textbooks end for those already familiar with the elementary concepts Such a volume would be tailored to specialists in all fields of science and industry interested in the most recent results in mineralogy This approach may be called Advanced Mineralogy Here an attempt has been made to survey the current possibilities and aims in mineral matter investigations including the main characteristics of all the methods the most important problems and topics of mineralogy and related studies The individual volumes are composed of short condensed chapters Each chapter presents in a complete albeit condensed form specific problems methods theories and

directions of investigations and estimates their importance and strategic position in science and industry

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