

EDTA Titration for Determination of Calcium and Magnesium

Before attempting this experiment, you may need to consult the section in the textbook dealing with complexometric titrations. In this procedure a stock solution of EDTA will be standardized against primary standard CaCO_3 . This standardized EDTA solution is then used to determine water "hardness" – the total calcium and magnesium content, typically expressed as equivalent calcium carbonate mass concentration. While both metals are nutrients that are needed for good human health, high concentrations of these cations (Ca^{2+} and Mg^{2+}) in water can cause deposits to form in bathrooms and kitchens, and cause the formation of "soap scum" – clogging pipes and decreasing the effectiveness of the cleanser. Therefore, very hard water is undesirable for use as tap water. Guidelines for classification of water as provided by the U.S. Geologic Survey are listed in the table below. The USGS website has more information about water hardness and alkalinity if you are interested. We're fortunate in that most of the water in the Portland area is soft.

Table 1 U.S. Geological Survey Classification of Water Hardness

(Source: <http://water.usgs.gov/wmg/hardness-alkalinity.html>)

CaCO_3 (mg/L)	Hardness
0-60	soft
61-120	moderately hard
121-180	hard
>180	very hard

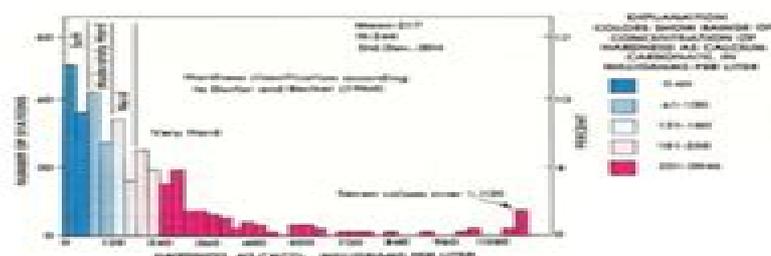


Figure 1 Hardness classification from Briggs et al. 1977

Briggs, J.C., and Ficke, J.F., 1977, Quality of Rivers of the United States, 1975 Water Year -- Based on the National Stream Quality Accounting Network (NASQAN): U.S. Geological Survey Open-File Report 78-200, 436 p.

Calcium Analysis By Edta Titration

**Norman B. B. Johnstone, Thomas C.
Downie**



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Handbook of Water Analysis Leo M.L. Nollet, Leen S. P. De Gelder, 2000-06-27 This work details water sampling and preservation methods by enumerating the different ways to measure physical chemical organoleptical and radiological characteristics It provides step by step descriptions of separation residue determination and cleanup techniques for a variety of fresh and salt waters It also discusses information regarding the analysis and detection of bacteria and algae

Food Analysis Laboratory Manual S. Suzanne Nielsen, 2010-03-20 This second edition laboratory manual was written to accompany Food Analysis Fourth Edition ISBN 978 1 4419 1477 4 by the same author The 21 laboratory exercises in the manual cover 20 of the 32 chapters in the textbook Many of the laboratory exercises have multiple sections to cover several methods of analysis for a particular food component of characteristic Most of the laboratory exercises include the following introduction reading assignment objective principle of method chemicals reagents precautions and waste disposal supplies equipment procedure data and calculations questions and references This laboratory manual is ideal for the laboratory portion of undergraduate courses in food analysis

Food Analysis Suzanne Nielsen, 2003-04-30 This book provides information on the techniques needed to analyze foods in laboratory experiments All topics covered include information on the basic principles procedures advantages limitations and applications This book is ideal for undergraduate courses in food analysis and is also an invaluable reference to professionals in the food industry General information is provided on regulations standards labeling sampling and data handling as background for chapters on specific methods to determine the chemical composition and characteristics of foods Large expanded sections on spectroscopy and chromatography are also included Other methods and instrumentation such as thermal analysis selective electrodes enzymes and immunoassays are covered from the perspective of their use in the chemical analysis of foods A helpful Instructor s Manual is available to adopting professors

A Brief Introduction to Quantitative Chemical Analysis Robert Blanchard Fischer, Dennis G. Peters, 1969 *Selected Technical Publications* United States. Food and Drug Administration, 1966

Inorganic Titrimetric Analysis Walter Wagner, Clarence Joseph Hull, 1971

Treatise on Titrimetry: Inorganic titrimetric analysis, by W. Wagner and C. J. Hull Joseph Jordan, 1971

Report - US Army Medical Research Laboratory Army Medical Research Laboratory, 1947

Chemical Analysis Herbert August Laitinen, 1960 Equilibrium and activity Acid base equilibria in water Acid base equilibria in nonaqueous solvents Applications of acid base titrations Solubility of precipitates the formation of precipitates Colloidal properties of precipitates Aging of precipitates Contamination of precipitates Thermal decomposition and volatilization

Bulletin, 1977

Handbook of Rock Analysis P. J. Potts, 2003

An Introduction to Chemical Analysis Walter Edgar Harris, Byron Kratochvil, 1981

[Titrimetric Analysis](#) Norman B. B. Johnstone, Thomas C. Downie, 1961

[Quantitative Analysis](#) Harvey Diehl, 1970

Chemical Analysis of Ecological Materials Stewart E. Allen, 1974

A Textbook of Pharmaceutical Analysis Kenneth A. Connors, 1982-09-16 A Practical Guide to Molecular

Cloning By Bernard Perbal Presents detailed procedures for all phases of DNA cloning experiments Starting with laboratory equipment and safety considerations this practical guide goes on to describe enzymes vectors purification and characterization techniques genetic mapping modification of DNA fragments with cohesive termini ligation preparation of genomic libraries sequencing of DNA and more 1984 554 pp Pharmaceutical Calculations 2nd Ed By Joel L Zatz Expanded and updated this examination of pharmaceutical calculations features a programmed format designed for fast paced learning and a progression of topics that builds on previous instruction The second edition of this popular text includes current unit designations and abbreviations additional material on the alligation technique and infusion calculations and many new problems 1981 388 pp Drug Level Monitoring Volume 2 Analytical Techniques Metabolism and Pharmacokinetics By Emil T Lin and Wolfgang Sad e The second volume in a series that describes drug level assays in biological fluid Reviews of the analysis metabolism and pharmacokinetics of 16 major classes are included Details are presented on therapeutic drug concentrations in plasma pharmacokinetic parameters and a large number of drug assay procedures applicable to biological specimens All of these subject areas have been carefully combined to render this book a unique reference source teaching tool and guide to drug level monitoring 1985 250 pp **Plant Analysis** ,1959 Manuscript Report Series (oceanographic and Limnological) ,1965 Chemical Analysis of Ceramic and Allied Materials S. Dasgupta,1985 *Journal of the Association of Official Analytical Chemists* ,1968

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