

## Performance of Flowing and Quiescent Free-Diffusion Junctions in Potentiometric Measurements at Low Ionic Strengths 2450

A stable, well-defined solution boundary, rather than cylindrical symmetry, is the major requirement for stable, free-diffusion junctions that can be used to precisely ( $\pm 0.001$  pH) measure the pH of  $10^{-4}$  M solutions.

**Terence R. Harbinson and William Davison\***, The Freshwater Biological Association, The Ferry House, Ambleside, Cumbria LA22 0LP, United Kingdom *Anal. Chem.*, 59 (1987)

## Investigation of pH-Dependent Complex Equilibria at Low Ligand to Metal Ratio by Nonlinear Least-Squares Fit to Linear-Sweep or Cyclic Voltammetric Data 2456

The voltammetric determination of stability constants in the case of stepwise formation of stable complexes is illustrated for the copper(II)-oxalate system.

**Harald Gampp**, Institut de Chimie, Université de Neuchâtel, CH-2000 Neuchâtel, Switzerland *Anal. Chem.*, 59 (1987)

## Infrared Studies of the Liquid Crystal *N*-(*p*-Cyanobenzylidene)-*p*-octyloxylaniline Coated on Underivatized and Trimethylsilane-Derivatized Silica 2460

Variations in the IR band shape from the nitrile stretch region for varying amounts of CBOA coated on underivatized and trimethylsilane-derivatized silica are postulated to arise from differences in relative populations of hydrogen-bonded and nonhydrogen-bonded cyano groups.

**C. J. Hann and R. K. Gilpin\***, Department of Chemistry, Kent State University, Kent, Ohio 44242 *Anal. Chem.*, 59 (1987)

## Direct Correlation of Ion and Electron Microscopic Images by Digital Image Superpositioning 2463

Correlation of ion and electron micrographs is successfully achieved using a computer algorithm that digitally superimposes the images upon one another. The method allows for the verification and correction of artifacts that can degrade ion image quality.

**Lisa K. Turner, Yong-Chien Ling, Mark T. Bernius, and George H. Morrison\***, Baker Laboratory of Chemistry, Cornell University, Ithaca, N.Y. 14853-1301 *Anal. Chem.*, 59 (1987)

## Determination of Arsenic, Selenium, and Antimony Using Metastable Transfer Emission Spectrometry 2468

Analytes are directly determined from aqueous solution, unlike most other atomic spectrometric techniques that require a separation-preconcentration procedure to achieve good sensitivity. Detection limits for As, Se, and Sb are 22, 16, and 65 pg, respectively.

**William H. Hood and Thomas M. Niemezyk\***, Department of Chemistry, The University of New Mexico, Albuquerque, N.M. 87131 *Anal. Chem.*, 59 (1987)

## Resonance Ionization Spectrometric Determination of Gallium Using an Electrothermal Graphite Atomizer 2472

Ga is determined at concentrations below the  $\mu\text{g/g}$  level in water solutions and in solid germanium. Reproducibility is better than 15% when 50 pg of Ga is determined. Detection limits of  $5 \times 10^7$  atoms for pure Ga samples and  $3 \times 10^{10}$  atoms/cm<sup>3</sup> in germanium samples are obtained.

**George Bekov and Vladimir Radaev**, Institute of Spectroscopy, USSR Academy of Sciences, SU-142092 Troitsk, Moscow Region, USSR, and **Jari Likonen, Riitta Zilliacus, Iiro Auterinen, and Eeva-Liisa Lakomaa\***, Technical Research Centre of Finland, Reactor Laboratory, Otakaari 3 A, SF-02150 Espoo, Finland *Anal. Chem.*, 59 (1987)

## Radiotracer Investigation of the Interference of Hydrofluoric Acid in the Determination of Arsenic and Antimony by Hydride Generation Atomic Absorption Spectrometry 2476

Improved procedures are proposed to eliminate the interference of hydrofluoric acid in the hydrogenation and absorption measurement stages and also in the reduction of Sb(V) to Sb(III).

**Kilian Petrick and Viliam Krivan\***, Sektion Analytik und Höchstreinigung, Universität Ulm, Oberer Eselsberg, D-7900 Ulm/Donau, FRG *Anal. Chem.*, 59 (1987)

## Determination of Boron Isotope Ratios in Geological Materials by Inductively Coupled Plasma Mass Spectrometry 2479

Boron isotope ratios can be determined with a precision of 0.7% in materials containing as little as 0.5 ppm B.

**D. Conrad Gregoire**, Geological Survey of Canada, Ottawa, Ontario, Canada K1A 0E8 *Anal. Chem.*, 59 (1987)

## Characterization of Radiation-Induced Damage to Polyadenylic Acid Using High-Performance Liquid Chromatography/Tandem Mass Spectrometry 2484

Polyadenylic acid is irradiated to 1000 Gy in N<sub>2</sub>O-saturated aqueous solution at neutral pH and then enzymatically hydrolyzed to the mononucleoside level. HPLC/MS-MS is used to characterize a number of molecular products that result from the radiation-induced modifications to the model nucleic acid.

**Anthony J. Alexander and Paul Kebarle**, Department of Chemistry, University of Alberta, Edmonton, Alberta, Canada T6G 2E3, and **Alfred F. Fuciarelli and James A. Raleigh\***, Department of Radiobiology, Cross Cancer Institute, Edmonton, Alberta, Canada T6G 1Z2 *Anal. Chem.*, 59 (1987)

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## Preconcentration of Trace Metals from Seawater with 7-Dodecenyl-8-quinolinol Impregnated Macroporous Resin 2491

The extraction behavior of the DDQ resin for 12 metals is studied, and column extraction with the resin is successfully applied to the preconcentration of metals at nanogram-per-liter levels.

**Kenji Isshiki, Fumito Tsuji, and Tooru Kuwamoto**, Department of Chemistry, Faculty of Science, Kyoto University, Kyoto 606, Japan, and **Eiichiro Nakayama\***, Instrumental Analytical Research Center, Faculty of Science, Kyoto University, Kyoto 606, Japan  
*Anal. Chem.*, 59 (1987)

## Reversed-Phase High-Performance Liquid Chromatography of Substituted Anilines Utilizing Molecular-Recognizing Ability of Crown Ether: Comparison with Ion-Pair Chromatography 2496

The addition of 18-crown-6 to the mobile phase enhances retention of substituted anilines. The degree of enhancement reflects number, position, and functionality of substituent groups, which enables specific separation of positional isomers.

**Akimasa Shibukawa, Terumichi Nakagawa\*, Atsunori Kaihara, Kumiko Yagi, and Hisashi Tanaka**, Faculty of Pharmaceutical Sciences, Kyoto University, Sakyo-ku, Kyoto-shi 606, Japan  
*Anal. Chem.*, 59 (1987)

## Synthesis and Characterization of 2- $\mu$ m Wide-Pore Silica Microspheres as Column Packings for the Reversed-Phase Liquid Chromatography of Peptides and Proteins 2501

Separation of ribonuclease, insulin, lysozyme, myoglobin, and ovalbumin is accomplished in 50 s using 2- $\mu$ m C<sub>4</sub>-modified silica packed in a 3.3  $\times$  0.62 cm column.

**Neil D. Danielson\* and J. J. Kirkland**, E. I. du Pont de Nemours and Company, Central Research and Development Department, Experimental Station, Wilmington, Del. 19898

*Anal. Chem.*, 59 (1987)

## Detection Limits with Specified Assurance Probabilities 2506

A detection limit-estimation methodology that protects against both false positives and false negatives is described. The method is demonstrated with an experiment involving extractable analytes.

**C. Andrew Clayton\*, John W. Hines, and Phyllis D. Elkins**, Research Triangle Institute, Research Triangle Park, N.C. 27709

*Anal. Chem.*, 59 (1987)

## Three-Component Self-Modeling Technique Applied to Luminescence Spectra 2515

Selection of pure component spectra coefficients is improved when additional applicable constraints are imposed. The method is applied to resolve experimental spectra composed of the fluorescence of two conformers of *trans*-1,2-di(2-naphthyl)ethene and a background spectrum dominated by Raman emission in the excitation wavelength region.

**Ya-Ping Sun, Donald F. Sears, Jr., and Jack Saltiel\***, Department of Chemistry, Florida State University, Tallahassee, Fla. 32306-3006

*Anal. Chem.*, 59 (1987)

## Photoacoustic Immunoassay Using Sensitivity Size Dependency for Determination of Turbid Solutions 2519

The rheumatoid factor is determined with a latex agglutination method and photoacoustic spectroscopy. The detection limit of this method is three orders of magnitude lower than conventional immunoassay using turbidimetry.

**Takehiko Kitamori\* and Kazumichi Suzuki**, Energy Research Laboratory, Hitachi, Ltd., Hitachi, Ibaraki 316, Japan, and **Tsuguo Sawada and Yohichi Gohshi**, Department of Industrial Chemistry, Faculty of Engineering, University of Tokyo, Bunkyo-ku, Tokyo 113, Japan  
*Anal. Chem.*, 59 (1987)

## Improvement in the Definitions of Sensitivity and Selectivity 2522

New definitions of selectivity and sensitivity allow the prediction of analytical error for multicomponent analysis. The estimated error is always the lower limit of the experimentally verified analytical error.

**Gerhard Bergmann, Birgit von Oepen, and Peter Zinn\***, Lehrstuhl fuer Analytische Chemie, Ruhr-Universitaet Bochum, 4630 Bochum 1, West Germany  
*Anal. Chem.*, 59 (1987)

## Parametric Mode Operation of a Hyperbolic Penning Trap for Fourier Transform Mass Spectrometry 2527

Symmetries of the hyperbolic Penning trap are reviewed en route to development of a mass calibration law, which is tested at a magnetic field of 1.2T using 1,1,1,2-tetrachloroethane major fragment ions and a new pulse excitation method.

**D. L. Rempel, E. B. Ledford, Jr., S. K. Huang, and M. L. Gross\***, Department of Chemistry, University of Nebraska, Lincoln, Neb. 68588  
*Anal. Chem.*, 59 (1987)

## Correspondence

### Mixed-Mode Column Thermospray Liquid Chromatography/Mass Spectrometry 2533

**John R. Lloyd, Mary Lou Cotter, David Otori, and Alan R. Oyler\***, Research Laboratories, Ortho Pharmaceutical Corporation, Raritan, N.J. 08869-0602  
*Anal. Chem.*, 59 (1987)

## Aids for Analytical Chemists

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**D. E. Bautz and J. D. Ingle, Jr.\***, Department of Chemistry, Oregon State University, Corvallis, Ore. 97331  
*Anal. Chem.*, 59 (1987)

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**Maximilian Swerev and Karlheinz Ballschmiter\***, Analytische Chemie, Universität Ulm, Oberer Eselsberg, D-7900 Ulm, Federal Republic of Germany  
*Anal. Chem.*, 59 (1987)



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Liang Li and David M. Lubman\*, Department of Chemistry, The University of Michigan, Ann Arbor, Mich. 48109  
*Anal. Chem.*, 59 (1987)

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Robert J. Engelbach, Arlene A. Garrison, E. L. Wehry\*, and Gleb Mamantov\*, Department of Chemistry, University of Tennessee, Knoxville, Tenn. 37996  
*Anal. Chem.*, 59 (1987)

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Louis R. Alexander\*, Vince L. Maggio, Vaughn E. Green, James B. Gill, Elizabeth R. Barnhart, and Donald G. Patterson, Jr., Toxicology Branch, Environmental Health Laboratory Services, Center for Environmental Health, Centers for Disease Control, Atlanta, Ga. 30333, and Lance C. Nicolaysen, Chemistry Department, Emory University, Atlanta, Ga. 30322  
*Anal. Chem.*, 59 (1987)

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Jeffrey H. Sherman and Neil D. Danielson\*, Department of Chemistry, Miami University, Oxford, Ohio 45056  
*Anal. Chem.*, 59 (1987)

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